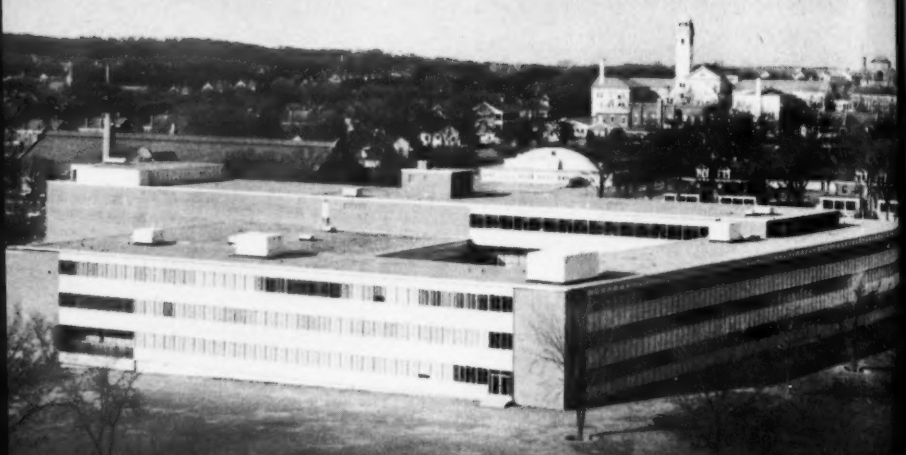
MILITARY REVIEW

OF MICHIGAN
APR 8 1960
PERIODICAL
READING ROOM

U. S. ARMY COMMAND AND GENERAL STAFF COLLEGE
FORT LEAVENWORTH, KANSAS

JUNE 1960 VOLUME XL NUMBER 3

U. S. Army Command and General Staff College



COMMANDANT	Maj Gen Lionel C. McGarr
ASSISTANT COMMANDANT	Brig Gen William A. Cunningham, III
DEPUTY POST COMMANDER	Col F. A. Liwski, Arty
CHIEF OF STAFF	Col H. L. Ash, Inf
SECRETARY, USA CGSC	Col E. S. McKee, Inf
CHIEF OF RESIDENT INSTRUCTION	Col R. H. Schellman, Inf
CHIEF OF NONRESIDENT INSTRUCTION	Col R. H. Van Volkenburgh, Jr., Arty
CHIEF OF COMBAT DEVELOPMENTS	Col R. C. Works, Inf
CHIEF OF DOCTRINE	Col J. E. Arthur, Inf

Military Review

EDITOR IN CHIEF
COL KENNETH E. LAY, INF

SPECIAL SECTIONS EDITOR
LT COL CLEO S. FREED, ARMOR

SPANISH-AMERICAN EDITION
Editor
MAJ GILBERTO GONZÁLEZ-JULIÁ, INF

Assistant Editors
MAJ TOMÁS H. GUFFAIN, INF
MAJ JUAN R. MELÉNDEZ, INF
CAPT ANTONIO BUDET, INF

BRAZILIAN EDITION
Editor
LT COL ALBERTO DE A. CARDOSO, INF

Assistant Editor
MAJ MAURÍCIO FELIX DA SILVA, ARTY

ADMINISTRATIVE OFFICER
1ST LT RONALD M. HANSEN, SIGC

PRODUCTION OFFICER
LT COL LOUIS RUIZ, CMLC

STAFF ARTIST
CHARLES A. MOORE

MISSION.

The MILITARY REVIEW, official publication of the United States Army and the United States Army Command and General Staff College, disseminates modern military thought and current Army doctrine concerning command and staff procedures of the division and higher echelons and provides a forum for articles which stimulate military thinking. Authors, civilian and military alike, are encouraged to submit articles which will assist in the fulfillment of this mission.

POLICY.

Unless otherwise indicated, the views expressed in the original articles in this magazine are those of the individual authors and not those of the Department of the Army or the United States Army Command and General Staff College.

Editor.

MILITARY REVIEW—Published monthly by U. S. Army Command and General Staff College, Fort Leavenworth, Kansas, in English, Spanish, and Portuguese. Second-class postage paid at Fort Leavenworth, Kansas. Subscription rates: $3.50 (US currency) a year in the United States, United States military post offices, and those countries which are members of the Pan-American Postal Union (including Spain): $4.50 a year in all other countries.

MILITARY REVIEW

VOLUME XL JUNE 1960 NUMBER 3

CONTENTS

Dedication in Our Time ---------- 3
Dr. Frank H. Bowles

One Head for Research and Development-Combat Developments ---- 8
Lieutenant Colonel George K. Maertens, Infantry

Marshal Malinovsky and Missiles ---------- 14
Walter Darnell Jacobs

United States Army Technical Service Schools ---------- 21

Winter Warfare ---------- 42
Lieutenant Colonel Erkki Lahdenpera, Infantry

The Nerve Centers of Command ---------- 56
Major Edwin J. McCarren, Armor

Strategy of Protracted Defense ---------- 63
Slavko N. Bjelajac

Military Author Honorariums and Awards ---------- 70

MILITARY NOTES AROUND THE WORLD ---------- 71

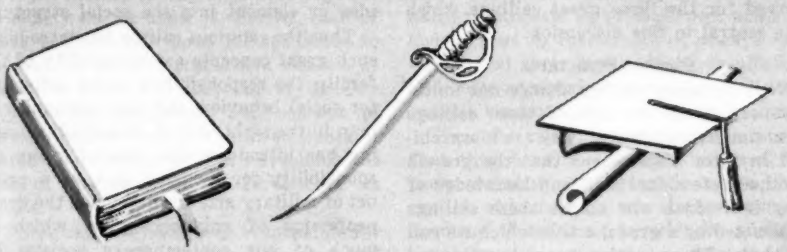
MILITARY DIGESTS ---------- 79
Evolution of the Infantry Division ---------- 80
The Nuclear Legion ---------- 89
Night Operations ---------- 95
The Pattern of Soviet Army Tactics ---------- 102

BOOKS OF INTEREST TO THE MILITARY READER ---------- 108

DEDICATION IN OUR TIME

Dr. Frank H. Bowles
President, College Entrance Examination Board

From an Address at Saint Peter's College, Jersey City, New Jersey, 3 December 1959



THE three great dedicated callings of our time—*the religious, the military, and the educational*—we have come to take for granted, for they are part of the fabric of our life. Because we take them for granted, we have, almost absent-mindedly, classified them as three among the many professions which manage our institutions. These include such old and honored professions as medicine, law, engineering, and the skilled practice of the arts, and such newly recognized professions as management, social work, journalism, and public administration. Also included, perhaps, is the newest of all—that of the management of opinion with all its subdivisions, such as the direction of the great mass communications media, radio and television, and the controversial areas of advertising, public relations, and opinion analysis.

In a technical sense, this is a proper classification, for all professions have in common the characteristic of being based on a body of specific knowledge and doctrine, the selection and training of practitioners through a long apprenticeship, and the final attainment of professional skill and the assumption of responsibility for specialized judgment and decision. Yet there are distinctions which override technical similarities.

The professions just enumerated are, in a sense, the product of an organized society. They are related immediately to the needs and problems of individuals. They have the purpose of easing our lives, al-

The importance of the three great dedicated callings of our time—the religious, the military, and the educational—lies in their purposes, by which our lives, our beliefs, and our faith are held secure

though sometimes they trouble them too. They supply services which are available at need, and they supply comfort and personal opportunity to those who practice them. Valuable and even necessary as they are to a smoothly functioning society, they do not control the stability or the nature of a society. They do not touch the fundamental needs of individuals for security, nor for understanding of man and his temporal environment, or for the attainment of the spiritual understanding which we call forth. These functions are reserved for the three great callings which are central to this discussion.

Similar Structures

It is certainly neither chance nor imitativeness which has molded these callings into similar structures. They are hierarchical in form. This means that the growth of the professional skill and knowledge of any individual who enters these callings is denoted by a grade, a title which we call a rank. These ranks have a universal meaning not only within a given society, or culture, but within any society or cultures, for these professions have similar characteristics in all societies and cultures.

They are controlled by a rigid and traditional discipline which includes the subordination of the individual to the requirements of the profession as a whole, and which vests judgment as to their requirements in those of senior rank. It also involves the acceptance of limits on personal reward, and, in effect, offers its rewards only in terms of increasing responsibilities and ever-deepening dedication.

In return for placing himself under discipline, the individual who does so is granted security within a life which is necessarily modest and often supported at a level perilously close to subsistence. He also is granted the priceless assurance of accomplishment in service, and, if he is unusually fortunate, he may know the tremendous satisfaction of being an instrument for the introduction of some new idea or element into the social structure.

Thus the religious calling has introduced such great concepts as the stability of the family, the responsibility of the individual for social behavior, and the community of man in the sight of God. The military calling has introduced the idea of group responsibility for security, and, as a product of military art, has developed the great profession of engineering on which so much of our contemporary society depends. The teacher has, over generations, worked unceasingly to affirm man's right to knowledge and the free use thereof. If he has not succeeded totally, he has, at least, established literacy and the idea of cultural heritage as basic concepts which are acknowledged and accepted even in the most illiberal societies.

Conservative Reaction

Because these callings are at the same time hierarchical and disciplined, they are also conservative. Dealing as they do with the foundations of society, they move slowly in response to pressures for change. It is right that they should do so, for many such pressures have appeared for relatively brief moments in the long span of human history, expressed their urgencies, and disappeared again. It has been pointed out that true change is a slow process and may take a thousand years for any truly new idea to be accepted within large social structures. Thus such ideas as that of universal literacy, or that men should

---

Dr. Frank H. Bowles received his B. A. and M. A. degrees from Columbia University. He also holds the Litt. D. from Wagner College; his LL. D. from Providence College; and received a L. H. D. from Dickinson College. Dr. Bowles held posts of successive importance at Columbia University from 1930 to 1947. He was on military leave from Columbia from 1942 to 1945 with the Bureau of Naval Personnel, and is now a commander, United States Naval Reserve. In 1947 and 1954 he conducted educational studies at the University of Puerto Rico. He became President of the College Entrance Examination Board, New York, in 1948.

have voice in their temporal governance, or that men should live in peace and love their neighbor, are not yet accepted throughout our world even though they have been a part of the common currency of thought for more than a thousand years.

These are callings which have their roots deep in history and which, indeed, are historically oriented to an extent which is true of no other professions. They are today essentially dedicated to the service of society and yet their history is longer than the history of any organized segment of society as we know it. Indeed, each of these callings has been indispensable to the development of states and nations as we know them and has, out of its own organization, discipline, and concept of service, contributed the basic elements of stability on which nations have built the idea of the state as the servant of its people.

These callings have been responsible for the basic idea of professional training and service on which all of our professions now rest. Even now, they are unique among professions in that they are self-sufficient in the management of their own selection of new individuals to enter their service and in the control of their own institutions for education and training.

Vocational Symbols

It is worthy of note that these three callings, alone, of all the contemporary groupings of society, have retained their own special symbols of vocation in uniforms, vestments, and badges which set them apart from all other groups. These symbols are, in a sense, an affirmation of continuity, for they may be traced in a direct line to the earliest emergence of the professions and the dignity and respect which are the strength of enduring values.

The definable characteristics which these callings have in common are matched by definable approaches to problems. All these professions have long since established this method of approach to any problem, large or small, as orderly, logical, and calculated. Within the method lies the paradox that they are simultaneously affirmative and pessimistic. They are affirmative in that they always stand for positive purposes and goals—the religious seeking to conform man to the great purposes of our creator; the military, the strength which guarantees peace, and with peace, stability and security; the teacher in his dual mission of searching out and explaining the ultimate secrets of our life and environment. But they are also eternally pessimistic as to their own achievements, alert to their failures, always convinced that their resources are insufficient and their personal competencies and dedications inadequate for the tasks at hand.

Thus the military can never be assured that they have the strength required for their mission; the teacher never has enough of knowledge, nor of the resources required to transmit knowledge; and the religious strive always for greater faith and greater works to affirm their faith.

Finally, to conclude this catalog of the characteristics of these callings, they are evangelistic and perfectionist. Their evangelism is an eternal expectation that the great truths on which the callings rest must and will be understood if only they can be truly communicated.

Leadership Tasks

From this it follows that the tasks of leadership in each of these callings have a continuing duality. On the one hand, there is the task of maintaining and strengthening the disciplined organization as a force in being, addressed to the visible tasks and problems in hand. The other task is that of gathering new strength by applying the skills that are inherent in what we call prosaically, the behavioral sciences, to the motivation and disciplining of new cadres who will carry the greater responsibilities that lie ahead.

Finally, these callings are perfectionist in that each looks forward to a time be-

yond the present when all goals will be reached, all negations overcome, and all doubters converted—a time when men will achieve peace, unity, security, understanding, and salvation.

The view of these three great callings, here offered, is, in effect, a form of inquiry into the human needs which brought them into being, which have maintained them through uncounted generations, and which have brought them to our time still vital, still dynamic, still the solid foundation of our social order.

Now it is time to cast forward for a view of these callings in time to come, for the only true certainty as to the future is uncertainty. We do not know the shape of tomorrow's world. Indeed, we do not really know the shape of our present world. There are few minds, perhaps none, that can grasp the enormity of the idea that we can now destroy in a day all that our race has built through all time past, and if we cannot understand this, we cannot truly know our world. We can only be certain that if there is a world of tomorrow, it will be built, as we have always built in the past, on the foundations supplied by these same three callings which are here joined in one purpose. Even within this certainty we face uncertainty as to the challenges which these callings must face, the forms which they will adopt, the new purposes which they must serve.

Religion

The religious calling is confronted with problems which arise from the paradox that we now have at hand the means to assure to all men the basic decencies of human life, including a reasonable chance of being able to attain adult status, sufficient food, and a measure of social freedom. We are a long way from realization of each of these, but we have seen them evolve from impossible hopes into evident facts in many regions. Even in entire countries we can see signs of still further changes to come, and we know that only political organization or the lack of it prevents the general enjoyment of these basic decencies. The paradox lies in the fact that the tasks of the religious calling become more complex and in a sense less direct as a culture moves from the terrible stability of subsistence to the mobility of affluence.

In a simple society, man's unity with God is a simple idea to be simply presented and simply accepted. In a mobile and affluent society, simple ideas become obscured and overlaid in the action and turmoil of daily living, and the religious calling is required to penetrate to every stratum of the complex structure in order to continue to communicate the continuing simplicity of its basic premise. Thus the calling itself becomes ramified and complex as it adapts to its changed environment. Its unity and its purpose remain unchanged, but its tasks are subdivided into a range of undertakings which span the tremendous distance from the devotional to the secular. In such a future it is impossible to overestimate the requirements for discipline, wisdom, administrative skill, and understanding of the human heart which its chosen leaders must bring to their appointed tasks.

Military

The military calling has before it tasks of comparable magnitude but of a different order. Military leadership has been defined as the management of violence, which is indeed a paradoxical definition, for violence always carries a connotation of unmanageability. Yet until this time in human development it has been a valid definition. Now we are faced with the certainty that violence, if it is again released on a large scale, will be unmanageable and so the military calling faces the need to reduce the amount of potential violence at its disposal through the complex arrangements which we call negotiated disarmament. Yet the hazards of total disarmament are unacceptable and so the military

calling continues and must continue in being.

In this strange relationship military organization must become increasingly compact, increasingly skilled, increasingly disciplined in order to avoid tragic error, and increasingly dedicated to its basic purposes.

We begin now to see the new form which this honored calling must accept. It is the form of a compact force, equipped with the finest products of our technology, and skilled in their use in that truest of all forms of defense of security, the advancement of human welfare. This is no new role for our military calling. Military engineers opened our Nation for settlement, exploring, building bridges, dams, railroads, and canals including the tremendous achievement of the Panama Canal. Military medicine conquered the worst of tropical diseases and opened the tropics to comfortable human habitation. Military administrators controlled the greatest scientific achievement of the century in the opening of the atomic age, and military engineers and scientists now are exploring the edges of outer space even as others explore the depths of oceans and the polar boundaries of our known world. These are not new facts for any of us, but taken together they are a magnificent proof that the military calling as we know it serves greatly whether in peace or in war.

It may well be that arms and armaments will become secondary for the military calling of the future, and the primary task will be the undertaking of enterprises so great as to be beyond the reach of ordinary undertakings. The exploration of space may be the most glamorous of these tasks. However, the pioneering of new methods of communication, of new vehicles for transportation, and the testing of new materials—even the guidance and supervision of major engineering undertakings in underdeveloped countries—may have more immediate importance for our time. But whatever its assignments and undertakings, we have our certainties that the military calling under its dedicated leadership will hold by its skills, its purposes, and its disciplines.

Education

Finally, we come to the calling of the teacher. The forces—social, scientific, and technological—that are changing the religious and the military calling are changing our education almost before our eyes. The average child born in 1900 in America could barely have expected to finish grammar school. The average child to be born in the year 2000 may expect to finish college. The eight years of schooling that lie between these two statements of averages represent social, financial, and psychological change such as the world has never seen before. The change we know, intense and dramatic, is in some measure reflected in every part of the globe. It is a change which will place heavy strains on the structure and the discipline of the teacher's calling. There will be knowledge to be sought, gained, verified, arranged, and presented. There will be new programs to be created. There will be new aspirations to be met, and some old and tragic oversights and failures to be remedied. There are abilities and talents which lie buried deep beneath layers of prejudice, poverty, and neglect as well as faults and problems which are common knowledge. Assuredly, there will be no shortage of tasks for the teacher's calling.

Within these three great callings, the future offers the least tangible task to the religious, the most difficult task of readjustment to the military, the largest to the teacher. But in a sense, the terms of reference to their future tasks do not affect these callings either in their own view of themselves or in such detached view of them as we are able to achieve. The importance lies rather in their purposes, for these are purposes by which our lives, our beliefs, and our faith are held secure.

ONE HEAD FOR RESEARCH AND DEVELOPMENT-COMBAT DEVELOPMENTS

Lieutenant Colonel George K. Maertens, *Infantry*
Faculty, U. S. Army Command and General Staff College

THE rapid pace of technological developments in the field of military weapons systems and other equipment makes it imperative that the US Army integrate under one head its Research and Development program and its Combat Developments program. The problems of reducing the leadtime required for developing new items of equipment have long been recognized by the Army, and continuous effort has been expended to shorten the time period required from the establishment of a materiel requirement until the item is approved for adoption. We still have a long way to go in reducing this leadtime, which may be as long as 10 years for some items of equipment.

However, the reduction of leadtime for materiel development solves only one facet of the over-all problem. Of equal importance is the early development of operational and organizational concepts which integrate the employment of new materiel. This half of the problem requires increased emphasis in order that our operational and organizational concepts can be kept abreast of materiel developments. Too often throughout military history the maximum capabilities of a new item of equipment could not be exploited immediately because organizational and operational concepts for its employment had not been developed.

Since the development of new military equipment, new organizations, and new tactics and techniques go hand-in-glove, these activities *must be integrated* as closely as practicable from Department of the Army Headquarters on down through the various echelons of command. Under our current organizations, however, there is a seemingly unnecessary and undesirable split of these closely related developmental functions between the (materiel) Research and Development (R&D) and the Combat Developments (CD) systems of the Army.

The scope of R&D functions extends from the inception of an idea to the creation and testing of new materiel through the final acceptance or rejection thereof for use by the Army. However, in order to develop materiel there must be established a firm requirement based on projected operational, organizational, and equipment concepts. Unfortunately, these concepts are generated under our CD system which is separate from R&D at all echelons of command. Both systems, of course, have a common goal, that is, modernization of the US Army.

Current Organizations

Let us examine briefly the Army's current organization for these two closely related programs. At the Secretary of the Army level there is the Director of Research and Development who has the rank

The rapid pace of technological developments of military weapons systems and other equipment makes it imperative that Research and Development and Combat Developments systems be integrated under one head

of an assistant secretary. He supervises the over-all Army R&D program for the Secretary of the Army. Under the Chief of Staff we find the Chief of Research and Development who is coequal to the deputy chiefs of staff for military operations, personnel, and logistics. The chiefs of the Army's technical services report to the Chief, R&D, concerning actual research and development activities within their respective areas of responsibility. So we find at DA level that the Chief, R&D, has primary general staff responsibility for planning, coordinating, directing, and supervising the Army Research and Development program. Figure 1 shows the R&D system.

UNITED STATES ARMY RESEARCH AND DEVELOPMENT SYSTEM

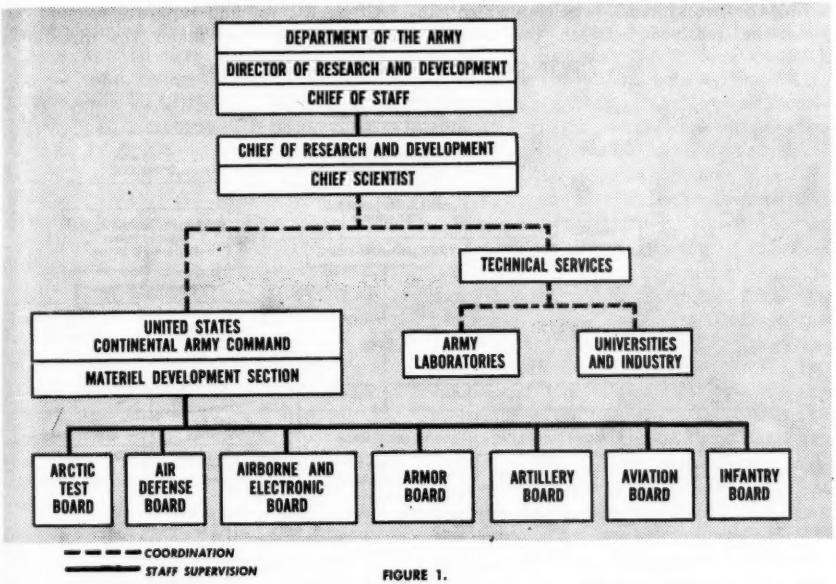


FIGURE 1.

On the other hand, the Deputy Chief of Staff for Military Operations (DCSOPS) is responsible for formulating the broad policy and guidance for the Combat Developments system. Admittedly, the importance of combat developments is not minimized. However, this function is only one of many major responsibilities of the DCSOPS. In fact, these combat developments matters are handled within DCSOPS by a small division working under the Director of Organization and Training. It appears then that at Department of the Army level our Combat Develop-

---

Lieutenant Colonel George K. Maertens was graduated from the United States Military Academy in 1943. He served with the Tank Destroyers, and as a company commander in the 99th Infantry Division during World War II. Later service includes duty with the Office, Chief of Army Field Forces; test officer with Army Field Forces Board Number 3; heavy mortar battalion commander; and G1 Section, Headquarters, Armed Forces Far East. A graduate of the Armed Forces Staff College in 1957, he is currently assigned to the faculty of the U. S. Army Command and General Staff College.

ments program may be obscured among the many and varied functions of DCSOPS. The actual direction and coordination of the Combat Developments program is accomplished by Headquarters, United States Continental Army Command. Figure 2 is the CD system.

Since there is no single agency controlling the two systems, problems which cannot be resolved between the Chief of Research and Development and the Deputy Chief of Staff for Military Operations must be resolved at the level of the Chief of Staff, US Army. At Department of the Army level the R&D program probably has a greater controlling influence on our future Army than does the CD program; yet, theoretically, the CD program should provide the firm basis for the R&D effort. No doubt, there is close coordination of these activities between R&D and DCSOPS, but if the research and development and combat developments effort were under one boss, the over-all program could be more closely integrated, with a resultant increase in efficiency and reduction in lead-time.

Separation of these closely related activities also exists below Department of the Army level. At Headquarters, USCONARC we find separate coequal R&D and CD sections under the direction of deputy chiefs of staff for materiel developments and combat developments, respectively, with the deputy commanding general the focal point for coordination and decision. Again, since the activities of R&D and CD are so interrelated, continuous detailed coordination must be effected between these sections in addition to normal coordination with other staff elements and field agencies. Despite the split in organization, members of each section must devote a large measure of time working

UNITED STATES ARMY COMBAT DEVELOPMENTS SYSTEM

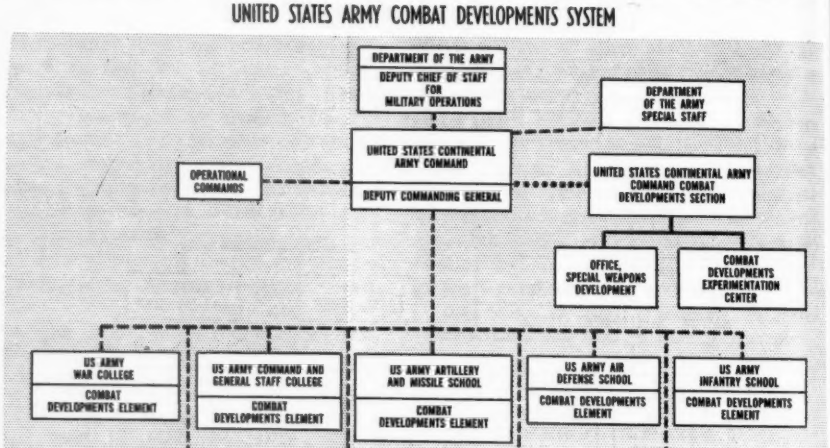


FIGURE 2.

with matters of primary concern to their counterpart section.

Test Boards and Service Schools

Operating directly under the Materiel Developments Section, Headquarters, USCONARC, are the various materiel test agencies such as the air defense, armor, artillery, aviation, and infantry boards. On the combat developments side of the picture we find that the various service schools (and colleges) are, in fact, CD agencies for USCONARC. Each of these schools has a separate CD element. Unlike the R&D boards, however, these CD elements do not report directly to Headquarters, USCONARC; they operate directly under their respective school commandants. Even so, the majority of their CD effort is expended on projects formally directed by Headquarters, USCONARC. Fortunately, for coordination purposes, both the USCONARC boards and the various CD agencies at the service schools are located on the same Army post. A major exception to this is at Fort Leavenworth where there is no R&D board parallel to the Combat Developments Department of the United States Army Command and General Staff College.

This brief rundown on the organizations of research and development and combat developments has highlighted the fact that these activities, although very closely allied, are conducted through separate staff channels at all levels of command.

It must be acknowledged that the current system of relating the Combat Developments and Research and Development systems is "ideal" in that the R&D program is supposedly based on the requirements generated as a result of new operational, organizational, and materiel concepts developed in the CD study program. Under this system the materiel concepts developed under the CD program establish qualitative materiel development objectives (QMDO's)—statements of military need for development of new materiel, the feasibility of which cannot be determined sufficiently to permit establishment of a qualitative materiel requirement (QMR). The QMR is an approved statement of a military need for an item, the development of which is believed feasible. (QMDO's are established under DCSOPS while the formulation and staffing of QMR's are the responsibility of the Chief of Research and Development.) Here is the initial link between the R&D/CD programs; that is, the Combat Developments system establishes long-range materiel objectives based on new concepts and the R&D program converts these objectives into materiel requirements.

With the publication in March 1958 of the Combat Developments Objectives Guide and the Army Transition Plan the Army has taken a step to relate these two programs more closely. The Combat Developments Objectives Guide includes detailed information concerning Combat Developments study projects and testing programs whose purpose is to develop and evaluate new concepts of operations, organizations, and equipment. It also outlines broad developmental objectives as approved by the Chief of Staff. The Army Transition Plan knits together the R&D and CD programs by forecasting the availability of new items of materiel for integration into the major elements of our current or projected Army organizations.

Realistic Analysis

Unfortunately, this "ideal" sequence of having the Combat Developments program provide the basis for the R&D program often is not realized. The converse is frequently the case. Scientific "breakthroughs" in R&D generate requirements for expedited combat developments projects to develop doctrine and organization for new materiel. This "reverse" sequence has been experienced down through the ages as "materiel developments" provided in succession such revolutionary military

tools as the bow and arrow, the cannon, the machinegun, the tank, the airplane, nuclear weapons, supersonic rockets and missiles, and next the space weapons of the future. Furthermore, there is nothing to indicate that this sequence will not occur in the future.

Proposals

What can be done to improve the Army's R&D and CD effort in order to reduce critical leadtime, to simplify management of these complex interrelated systems, and to ensure that, as new materiel is available, new concepts for its employment and organization are ready?

First, at Department of the Army level establish *one boss* over the two programs. In view of the myriad of current activities for which the Deputy Chief of Staff for Military Operations is responsible, I propose that the Chief of Research and Development take over responsibility for combat developments from the Deputy Chief of Staff for Military Operations and integrate these functions with R&D as shown in Figure 3. In short, one chief would be charged with the entire program for future modernization of the Army, in step with projected operations as forecast by the Joint Chiefs of Staff and national policy.

Second, at Headquarters, United States Continental Army Command level provide a deputy commander for R&D/CD in order to coordinate in detail these closely related programs. Again, the provision of one person responsible for directing these two programs and only these two programs would expedite staff actions and decision-making processes and would eliminate much duplication of effort.

Third, separate the combat developments agencies from the various service schools

PROPOSED SYSTEM COMBINING
RESEARCH AND DEVELOPMENT/COMBAT DEVELOPMENTS

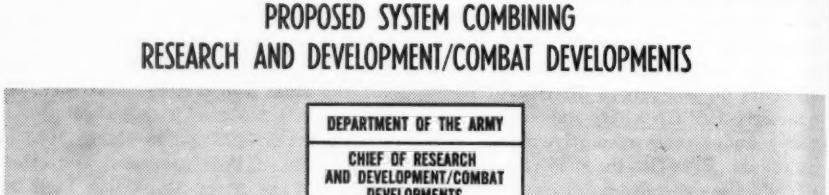

DEPARTMENT OF THE ARMY
CHIEF OF RESEARCH AND DEVELOPMENT/COMBAT DEVELOPMENTS
HEADQUARTERS UNITED STATES CONTINENTAL ARMY COMMAND
DEPUTY COMMANDER FOR MATERIEL AND COMBAT DEVELOPMENTS
MATERIEL DEVELOPMENT SECTION
COMBAT DEVELOPMENTS SECTION
MATERIEL TEST BOARDS
COMBAT DEVELOPMENTS AGENCIES

FIGURE 3.

(colleges) and establish combat developments boards adjacent to these schools. CD boards would operate directly under Headquarters, USCONARC in a relationship similar to that of the current Test Boards to Headquarters, USCONARC. These separate CD boards would devote their entire effort to the development of projects approved by USCONARC as part of the over-all integrated worldwide CD program. They would be located near service schools so as to facilitate informal coordination as required. Service schools would be provided USCONARC approved CD and R&D concepts and related guidance on which to base future warfare instruction. Of course, this proposed change would in no way detract from the service school mission of developing the doctrine needed to flesh-out approved concepts and to keep training literature up to date. New concepts or ideas developed by the staff and faculty and student bodies of service schools would be submitted to Headquarters, USCONARC to be forwarded to appropriate CD boards.

Fourth, reevaluate all materiel testing as currently performed at Test Boards to ensure that realistic *user* tests are being conducted, with no duplication of engineering tests (tests conducted by the technical services responsible for the development of the equipment). Too many so-called "user tests" are technical in nature, duplicating engineering tests conducted by technical services. User participation in engineering tests should be encouraged to obviate later duplication. This one proposal would do much to reduce leadtime as currently reflected in materiel test programs.

Fifth, expand and expedite the testing of concepts as currently conducted at the Combat Developments Experimentation Center, Fort Ord, California. This type of testing has long been a requirement for realistic evaluation of new organizations, operational concepts, and for troop test of materiel. Now that the test center has been established, its activities need to be expanded.

Long-Range Goal

These measures should materially assist the United States Army in its program for modernization, not just on a onetime basis but on a continuous cycle. Yet, these proposals should be considered only as interim unilateral actions required to bring immediate improvement. Of far greater importance is the requirement for a completely unified effort to modernize this Nation's Armed Forces. Such a joint undertaking is beyond the scope of this discussion; suffice it to say that, until the three services are provided *closely integrated joint requirements* based on *approved Joint Chiefs of Staff projected operational planning*, a common modernization goal for our services will not be achieved. Without this basis the Army will be forced to continue to develop future concepts on *assumed operational requirements and assumed sister service capabilities* to support these concepts.

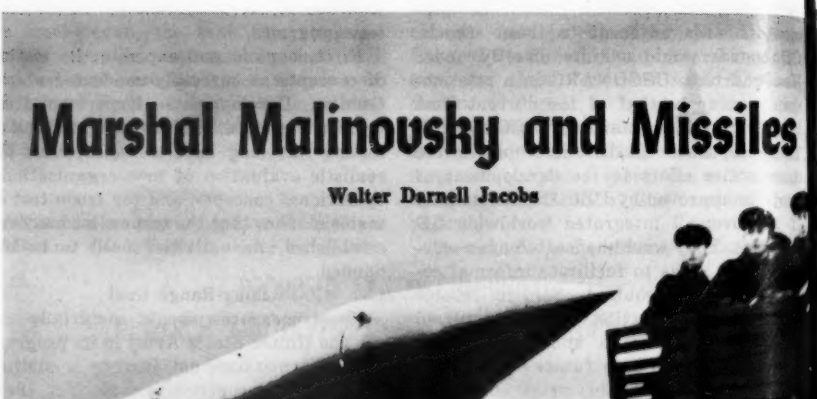
As a long-range goal, complete unified effort in our R&D/CD is the only logical course for all three of our military services.

What America is today and will be tomorrow depends upon our sense of individual responsibility for the maintenance of our military defenses as well as in all other areas of our national life.

Secretary of the Army Wilber M. Brucker

Marshal Malinovsky and Missiles

Walter Darnell Jacobs



"THE traditional invulnerability of America," Marshal of the Soviet Union Rodion Ia. Malinovsky boasted to the 21st Congress of the Communist Party, "is liquidated for all time."

In case the point might not be clear enough for some of his listeners, the Minister of Defense of the USSR spelled it out. He asserted that air forces and navies were already obsolete means of warfare and had been replaced by "a newer and more horrible means—intercontinental ballistic rockets." He declared that intercontinental ballistic rockets cannot be stopped by any known means of defense. "They are," he told the assembled Communists and the listening world, "capable of delivering hydrogen weapons of tremendous power to any point on earth—precisely to any point—they are very accurate."

The man who was able in February 1959 to threaten the United States with rockets had reached the highest military position in the Communist world when Marshal Georgi Zhukov was ousted for attempting to isolate the army from the party and for "Bonapartism." Malinovsky's path to the top had been marked by many successes but, at the same time, mystery and failures were not absent.

The word *malina* normally is translated from Russian as "raspberries." In some

Malinovsky's combat record indicates that he is a competent professional soldier, but it is most unlikely that he will exert a strong personal influence on the course of events in the USSR or in the world

outh Russian and Ukrainian dialects it ay mean "a criminal's hideout." As a ussian or Ukrainian surname, *malina* sually is rendered as "Malinovsky."

Marshal Malinovsky claims that his ame is a Russification of "Malinescu" hich his family bore when living in the Ukraine, near Bessarabia. The derivation f his surname was once a rather impor- ant matter for the present Soviet Defense Minister. In his application for admission o the Red Army he had stated that his ather was a farmer. In 1921 the *Cheka* (secret police) received an anonymous etter denouncing Malinovsky as a liar. The letter said that he was not a farmer's on but rather the scion of a Czarist po- ice official and hence not fit material for he Red Army.

Voroshilov and Bulganin confronted Malinovsky with the charge. Voroshilov was then the Political Commissar of the First Horse Army, Bulganin was a spe- cial agent sent by the *Cheka*, and Malinov- sky was a squadron leader in the First Horse Army. (With the inflation in titles then current in the Red Army, a squadron leader probably was about the equivalent of a normal troop commander or even of a platoon leader.)

Malinovsky had an explanation that was almost too facile and adroit. He ex- plained that there had been two families in his hometown—one, his own, which carried the name "Malinescu" and another, that of a local policeman, known as "Ma- lina." Since, as a policeman, Malina was the butt of jokes because of his name, he Russified it into Malinovsky. The Malines- cus also changed their name in order to avoid confusion with Romanians in the area. The result was two Malinovsky fami- lies in a small village. It might well be, Malinescu-Malinovsky suggested, that the writer of the letter had confused him with the son of Malina.

This explanation apparently satisfied Bulganin. In any event—because of the destruction by fire of the church records in Malinovsky's home village—the story could not be checked. There also was the fact that Malinovsky (of the Malinescu line) had been a better than average com- mander in the Red campaigns of 1920 in Poland. The *Cheka* decided to pigeonhole the denunciation for the time being.

Another stumbling block in Malinovsky's rise from peasant's (or policeman's) son to Minister of Defense of the USSR came in 1937. In that year the Stalin purges of the army caught up with Marshal Tuk- hachevsky, who was charged with treason against the Soviet Union in favor of Ger- many. The trial and the charge reflected on Malinovsky because Tukhachevsky (along with Voroshilov, Budenny, Timo- shenko, and Zhukov) had recommended him for membership in the Communist Party in 1925. With infinite and eternal suspicion, the OGPU, successor to the *Cheka*, looked into the records of all those who had been close to Tukhachevsky. For unexplained reasons, Malinovsky was able to survive this investigation as well as he had the Voroshilov-Bulganin investiga- tion of 1921.

Early Military Career

In the face of these political dangers, Malinovsky's military career was follow- ing a steady upward course. He had been most fortunate to serve in the First Horse

---

Mr. Walter Darnell Jacobs was on ac- tive duty in the Army from 1942 to 1953. A graduate of the Army Language School (Russian Course), he received a M. A. de- gree in Political Science from Columbia University as well as the Certificate of the Russian Institute in 1956. He was as- sociated with the Library of Congress un- til September 1957 where he was respon- sible for the Exchange Program with libraries and institutions in the Soviet Union. He has studied at Columbia Uni- versity on a Ford Fellowship, and has re- cently returned from a trip to Russia. Mr. Jacobs is a frequent contributor to the MILITARY REVIEW, *his most recent ar- ticle "Frunze Rides Again," appearing in the June 1959 issue.*

Army during the Soviet Civil War and the invasion of Poland in 1920. That army has always been a sentimental favorite of the Soviet Government and military authorities. In addition to Malinovsky, it produced Voroshilov, Budenny, Tiulenev, and many other heroes of the Soviet Army. A Soviet officer who served in the First Horse has a psychological advantage over other Civil War commanders. Malinovsky was not averse to turning the advantage to his own purposes.

After the Civil War, Malinovsky served in the usual peacetime positions and in 1927 entered the staff college of the Red Army (the Military Academy named for Frunze) in Moscow. He spent three years there as a student. He has declared that his years at the staff college:

Enriched my understanding of Marxist-Leninist science, raised the level of my Marxist Weltanschauung, *strengthened my Leninist party training . . . and gave me the true direction in the struggle with the Trotskiite-Zinov'ev opposition.*[1]

Malinovsky considered it secondary to this political education that the academy taught him "applied skills in the military art and . . . the ability to approach properly any problem and to organize its solution."

After his years at the military academy, Malinovsky served on battalion, regimental, and division staffs. He also had some command duty before returning to the staff college as an instructor in 1939. When war seemed to threaten in the spring of 1941, he was given command of a corps in the Odessa area.

World War II

All the promises of his earlier military career were brought to fulfillment in the war which the Soviets call "The Great Fatherland War." In December 1942 his "front" operated against Manstein in the area of the Kalmuk steppes. His action there made definite the defeat of the Sixth German Army at Stalingrad. Malinovsky then led the Second Ukrainian Front across the southern Soviet Union and into the countries of eastern Europe. Before V-E Day, he swept across Romania, Hungary, and Austria. He conquered the cities of Bucharest, Budapest, and Vienna in the name of the Red Army.

As a result of these actions, Malinovsky was certainly in the first rank of Soviet heroes of the war against Germany. After Hitler's defeat he was transferred to the Far East where he took command of the Transbaikal Front. Malinovsky brought his Second Ukrainian Front staff and several of its units to the Far East with him. The Soviet Union declared war on Japan on 8 August and Malinovsky began his attack into Manchuria on 9 August.

In an operation remarkable both for a lack of organized opposition and for speed of movement, Malinovsky moved his armored forces over 700 miles in five days.

Malinovsky's Far Eastern actions made possible the eventual establishment of Communist power in China and the raising of the North Korean puppet state. He was placed in charge of the postwar military organization in the area. His command—the Maritime Military District and Far Eastern Command—was reported to contain about 36 infantry divisions, six armored divisions, several airborne divisions, and three air armies.

Touches Korean War

Marshal Malinovsky's tour of duty in the Far East served to keep him out of the political in-fighting of the Kremlin and to place him, at the same time, in a strategically important area. The measure of its importance was demonstrated in 1950 when the North Korean Communist armies attacked across the 38th parallel into the Republic of Korea.

This assault, such a shock to the Western World, could hardly have come as a

[1] *Sorok let Voennoi Akademii imeni M. V. Frunze* (Forty Years of the Military Academy named for M. V. Frunze), Voennoe Izdatel'stvo, Moscow, 1958, p. 167.

surprise to Malinovsky. Not only was he the commander in the area, but his former chief of staff, General Terenti F. Shtykov, was the Soviet ambassador in the North Korean capital. It also has been reported that Stalin told Malinovsky of the Korean plans on May Day 1950 when the Far Eastern commander was visiting moscow.[2] In any case, Malinovsky had good reason to be apprised of the Korean adventure. In addition to information which he would have been able to get through normal channels, he was acquainted personally with two of the chief actors in the plot—Kim Il-sung of the North Korean Army and Liu Shao-chi of the Communist Chinese Government.

Malinovsky apparently did his job well in the Far East. He remained there until May 1956 when he was called back to duty in Moscow. He succeeded Marshal Koney as commander of the ground forces of the USSR. Whereas previously he had placed a claim to prominence by being able to yell "Long live Stalin" louder than any other person at banquets, when he got to Moscow again he distinguished himself by shouting "Long live Khrushchev" louder than the rest.

As Minister of Defense

He was elected a full member of the Central Committee of the Communist Party of the Soviet Union in 1956. In October 1957 he succeeded Marshal Zhukov as Minister of Defense. His new positions made it necessary for him to express his opinion on matters which he had been able to avoid earlier. A speech he made in commemoration of the 40th anniversary of the Soviet armed forces gave his views on several matters. This was his major public statement prior to the 21st Party Congress and deserves consideration in some detail.

Malinovsky first reviewed the history of the Red Army. The validity of his review can be judged from his remark that:

International reaction utilized German fascism as the striking force in the struggle against the Soviet Union. Many billions of dollars were invested by the monopolists of the USA and England in the creation of the German military machine and the Hitlerite aggressive Wehrmacht. *But in spite of the plans of international reaction, the Hitlerites, before attacking our country, directed a blow against England, France, and other capitalistic states. It would not be a bad idea for the imperialists of the USA and England to recall this historic lesson.*

(If Malinovsky's rockets are no more accurate than his history, the North American Continent is safe—unless he is shooting at Africa.)

Malinovsky did not neglect the Asian war. He stated that the Soviet armies defeated the most important groupings of the Japanese Army and "helped the great Chinese people to achieve its complete liberation."

He summed up the lessons of the Second World War as follows:

The struggle of the Soviet armed forces was decisive for all the course of the Second World War and decided its victorious outcome. The reactionary ruling circles of the USA and England, striving to bleed the Soviet Union white, attempted to avoid opening the second front by every excuse and did open it only in the latter stage of the war when it had become clear to them that the Soviet Army was capable of defeating Fascist Germany even without them.

Malinovsky also viewed postwar history. He said that the Soviet Army had gone into Hungary in 1956 "at the request of the Hungarian government" in order to help the workers of that state. "The Soviet Army," he said, "destroyed the counterrevolutionary *Putsch*, fulfilling with honor its international duty and defending

[2] Victor Alexandrow, *Der Herrenklub des Kreml*, Nest Verlag, Frankfurt on the Main, 1957, pp. 179-190.

the national independence and sovereignty of the Hungarian People's Republic."

A Look at the Present

From his view of the past, Malinovsky moved to a look at the present. He made the usual boasts about Soviet rockets and sputniks and said that everything would be splendid if only the capitalistic countries would cooperate. Instead, he said, "They are trying to aggravate international relations, are continuing the armaments race and preparation for a war against the Soviet Union and the countries of people's democracy." As a result he declared that the "armed forces of the USSR must be able at any moment to repulse a surprise attack of the aggressors on our country and on the allies of our state."

The armed forces of the Soviet Union, he assured his listeners, were ready for this putative blow. Among the means at the disposal of his ministry he listed "atom and hydrogen weapons, rocket technology, and complicated electronic devices." The ground forces, he added, were equipped with new automatic small arms, more powerful and long-range artillery, modern automobiles and tanks, excellent engineer material, and "the best tanks in the world." "Our ground forces," he concluded, "are capable of successfully deciding all missions which might be placed before them in time of war."

In a preview of his speech to the 21st Party Congress, he declared:

The Soviet armed forces have rockets of short, medium, long, and extreme range which are capable of delivering hydrogen weapons to any point on earth.

He made certain that he would avoid the fate of Marshal Zhukov when he proclaimed that the basic principle of the construction of the Soviet armed forces was "the leadership of the Communist Party." These forces he found to be fully educated and trained in the "spirit of Soviet patriotism and proletarian internationalism."

This speech is notable not only for its version of history, but also for the fact that it neglected to propound any views on the *military* aspects of the problems faced by the Soviet Union. The writings and speeches of Marshal Malinovsky which are available in the West are marked by a similar omission. His speech to the 21st Congress remedied this lack to some extent. Even earlier than that, however, he had given some clues as to his own military thought.

In 1957, shortly after the purge of Marshal Zhukov, he had reiterated the standard Soviet formula on war under contemporary conditions being a test of all combined arms and not capable of decision by any single weapon.[3] In the same speech he called for an improved air defense (without saying, as he did later, that there is no defense against ICBM's).

Up to the present, however, he has not created a body of writings which would give an indication of his views on military doctrine. Instead he has simply parroted the contemporary Soviet line on military affairs.

On Limited War

In addition to bragging about the accuracy of Soviet rockets, he has advanced some typical Soviet views on the concept of limited war.

Marshal Malinovsky noted a "very dangerous deception" which he said existed in the West. The deception he had in mind was the idea that future wars might not be "total" but might be "limited" or "local" but with the employment of tactical nuclear weapons. As reported by *Pravda*, 4 February 1959, Malinovsky called this "twaddle" and said it served only to mask the designs of the "monopolists" for the waging of "colonial wars, wars against weak countries, actions against the national-liberational movement, and wars against individual Socialist countries."

[3] *Krasnaia Zvezda*, 27 November 1957, p. 1.

This concept tends to confirm the present Soviet view that the "limited war" idea is meaningless in clashes between first-rate opponents. These wars, according to the Soviets, can only be decided by the employment of all arms and by the exertions of all sides of society. Marshal Malinovsky has not expressed a public opinion in opposition to this view.

Malinovsky made another pronouncement on Soviet military policy at the Tirana conference in late spring 1959. When Khrushchev said, "We have accurate rockets, don't we?" Malinovsky replied, "That's right."

Rattles Rockets

In recent days, Marshal Malinovsky has become somewhat more explicit if not more profound or creative.

He followed Khrushchev to the platform at the setting of the Supreme Soviet in January 1960 at which the 1.2 million-man reduction of the Soviet armed forces was announced. The stout little Marshal began by remarking, in disdainful disregard of the events in Finland in 1940 and in Hungray in 1956, that, "The Soviet Army and Navy never attacked anybody." He then set forth a rather detailed and patronizing description of rockets in general and Soviet rockets in particular. He said:

(The latest and most powerful means of waging war) are represented in our armed forces in sufficient numbers by ballistic rockets of various purposes, including operational-tactical rockets with a firing range of from tens to several hundred kilometers, and strategic ones, including intercontinental rockets with a practically unlimited range. Modern ballistic rockets have enormous speeds, altitude, and range and are capable of the reliable delivery of nuclear warheads of the most varied strengths to any point within a short space of time and under any meteorological conditions. . . . The rocket weapon is the most effective of all past and present means of warfare.

In case anyone missed the point, Marshal Malinovsky spelled it out by saying that about 100 such weapons could "reduce to a rubble" the territory of a highly developed industrial state of from 300,000 to 500,000 square kilometers. This friendly contribution to the spirit of Camp David has been repeated in more recent Soviet writings, especially in a 9 March 1960 article by Major General Pokrovsky in the paper *Sovetskii flot* (Soviet Fleet).

Marshal Malinovsky participated in the propaganda and agitation program surrounding the reduction-of-the-armed-forces gambit. His remarks, reprinted in detail in *Krasnaia Zvezda* of 20 January 1960, were an echo of the Khrushchev remarks on the same subject. Malinovsky attacked Rockefeller, Truman, and Acheson as forces active against the relaxation of international tensions. He then contributed his own efforts to the relaxation of such tensions by saying "we could literally wipe off the face of the earth the country or countries attacking us."

The same line was followed in the Marshal's article, "On Guard Over Peace," which appeared in *Pravda* for 23 February 1960. He interlarded references to the "consistently peaceful policy" of the Soviet Union with claims about the great destructive ability of the Soviet rockets.

In his office as Minister of Defense of the Soviet Union, Rodion Ia. Malinovsky has been preceded by Leon Trotsky, Mikhail Frunze, Kliment Voroshilov, Semen Timoshenko, Iosif Stalin, Nikolai Bulganin, Aleksander Vasilevsky, and Georgi Zhukov. Of these, at least three—Trotsky, Frunze, and Stalin—have produced a large body of writings on military doctrine. The others have produced a modest amount. To date, Malinovsky has produced almost none. This is only one of the indications that the present defense minister will remain a secondary figure in Soviet affairs and, eventually, in Soviet history.

Not a Major Figure

The circumstances of his choice for his present position also indicate that he is not fated to be a major figure in Soviet affairs. When Zhukov fell on evil days, it was generally thought that his successor would be Marshal I. S. Konev. Konev had a record of close association with and support of Khrushchev. When he was passed over in favor of Malinovsky, most observers assumed that Malinovsky was a sort of compromise choice—acceptable both to the party (including the Khrushchev and the opposition elements) and to the army (which might object to Konev's political background). As a compromise choice, Malinovsky has as yet been unable to gain the personal power which was held by such as Trotsky, Frunze, and Stalin and apparently aspired to by Zhukov. If Malinovsky does become a major figure, it will be in the face of party plans to the contrary; and until he becomes a major figure, he is unlikely to produce a large volume of independent writing on military subjects.

This is not to suggest that Malinovsky is not a competent soldier. His combat record indicates that he certainly is that. To date, nonetheless, he has shown himself to be little more than a competent professional soldier who is willing to bend himself to the will of the politicians who may at any time be in power in the Soviet Union.

Much more certainly will be heard from or about Malinovsky in the future. If the Soviet Union succeeds in getting a major military figure in on the "exchange" gambit, Malinovsky is likely to be the person named. In fact, the Soviets, who never give something for nothing, have long been trying to sell the idea that General Twining's visit to the USSR makes them owe us a visit.

In spite of this, however, Malinovsky is not likely to exert a strong personal influence on the course of events in the USSR or in the world. If the time comes when the Soviets decide to push the button, it may be Malinovsky who does the pushing—but some Communist Party figure will tell him when.

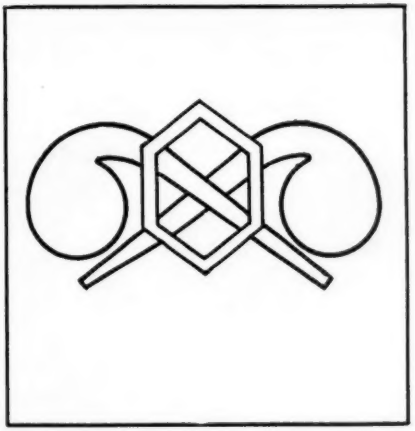
I, for one, do not believe that the Soviets have relented in the slightest in their determination to dominate the world and destroy our way of life. At the present time, the Soviet Union presumably wants to 'relax tensions,' but only those they themselves have created, such as Berlin. Remember this: If Russia relaxes tensions, it will only be in her own self-interest. She will tighten the tensions when it is again to her interest. Such is the nature of communism. Against it we can mount only constant guard for our security and maintain positive and adequate pressures to neutralize Soviet advances. We must not be lulled into a false sense of security, no matter what their tactics!

As long ago as 1931, a prominent member of the Lenin School of Political Warfare, Dimitri Manuilsky, declared: 'Our time will come in 20 to 30 years. The bourgeoisie will have to be put to sleep, so we will begin by launching the most spectacular peace movement on record. There will be electrifying overtones and unheard-of concessions. The Capitalist countries, stupid and decadent, will rejoice to cooperate in their own destruction. They will leap at another chance to be friends. As soon as their guard is down we shall smash them with our clenched fist.'

Lieutenant General Arthur G. Trudeau

UNITED STATES ARMY TECHNICAL SERVICE SCHOOLS

The MILITARY REVIEW *is pleased to present a limited pictorial coverage of the United States Army Technical Service Schools. Material for this feature was furnished by the schools. All photographs are official United States Army Photos.—Editor.*



THE United States Army Chemical Corps School is one of the oldest of the Chemical Corps organizations. It was established during World War I at Lakehurst, New Jersey; moved to Edgewood Arsenal, Maryland, in the fall of 1920; and was relocated at Fort McClellan, Alabama, in the summer of 1951. The present facilities shown in the photographs were completed and occupied in October 1954. The school has graduated over 30,000 students in the last 40 years.

The Chemical Corps School conducts 75 to 80 courses a year of all varieties. It provides Chemical Corps officers with basic and advanced career courses, and with specialized training in nuclear warfare and radiological defense. It trains officers from other arms and services in radiological defense and nuclear weapons effects.

The Technical Service Schools occupy an important position in the Army's over-all educational effort. Emphasis in the schools' curriculums is placed on leadership as well as on achievement of technical proficiency

United States Army Chemical Corps School, Fort McClellan, Alabama

Smoke generator in operation

The courses for enlisted personnel range from those designed for Chemical Corps trainees to advanced courses for senior noncommissioned officers.

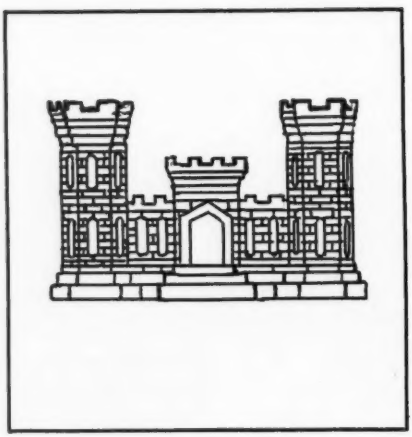
The school has established many official and personal relationships with the city of Anniston, Alabama, and has each year conducted tours of its interesting modern facilities for school children, civic groups, and visiting allied and United States military dignitaries.

While the main emphasis of the school is on chemical, biological, and radiological warfare, it also is extremely proud of a sophisticated management subcourse which features topflight speakers from the business, professional, and academic world, as well as military instructors.

The motto of the US Army Chemical Corps School is *Elementis Regamus Proelium*—"Let Us Rule the Battle by Means of the Elements."

Students perform experiments during a class session

Portable flamethrower in operation



THE mission of the United States Army Engineer School is to develop, administer, and support a progressive program of resident and nonresident education and training of officers, warrant officers, and civilians of all components of the Army Establishment in the functions, tactics, and techniques of the Corps of Engineers; to assist in the development of engineer doctrine, techniques, and functions; to train selected enlisted personnel of all components of the Department of Defense in the engineering skills required by the mission of the Corps of Engineers; and to prepare, revise, and review training literature required by the Chief of Engineers.

Resident instruction at the US Army Engineer School is centered in four academic departments—Military Art, Engineering, Mechanical and Technical Equipment, and Topography.

The Department of Military Art concentrates on the role of the engineer in combined combat operations. It is responsible for instruction in the doctrine and techniques of general Army-wide military subjects, emphasizing both the engineer functions and the nuclear aspects of tactics and logistics.

The Department of Engineering conducts instruction in the technical aspects of modern warfare, including such fields as bridge construction, mine warfare, camouflage, roads and airfields, quarry operations, demolitions, and soils analysis.

The Department of Mechanical and Technical Equipment teaches highly specialized courses in the effective utilization, repair, maintenance, application, characteristics, and operation of engineer equipment, including that peculiar to the guided missile program. As a part of the latter program this department maintains a Missile Support Branch which trains personnel in the engineer support duties for the *Redstone* and *Nike* missiles.

The Department of Topography teaches topographic mapping, surveying, computing, map compilation and reproduction, and drafting. It also takes part in the guided missile program through instruction of personnel in the techniques of target acquisition and location.

The Department of Nonresident Instruction (D/NRI) accomplishes that phase of

Headquarters, United States Army Engineer Center

Preparing ground for culvert installation

the school's mission related to nonresident instruction. This includes the engineer extension course program, serving over 15,000 students in over 125 subcourses and paralleling the resident courses; support of the engineer ROTC program in colleges and universities; support of the United States Army Reserve school program; and a unit training support program for engineer units in all Army components.

Training film is made of bridge construction

Students performing a scheduled monthly inspection of a ditching machine

THE mission of the United States Army Medical Service School is expressed by the school motto, "To Conserve the Fighting Strength."

To its classrooms at Brooke Army Medical Center come almost all physicians, nurses, dentists, veterinarians, and enlisted technicians in fields adjacent to and necessary for medical care.

Enlisted men and women, in numbers averaging about 800 or more, study technical subjects necessary to relieve the physician of some of his burden and provide him with diagnostic procedures such as X-ray or laboratory studies, as well as much of the actual bedside care given to sick and injured patients. Several courses are taught at both basic and advanced levels to provide technicians of varying skills. A total of 18 different courses are now offered for enlisted men and women.

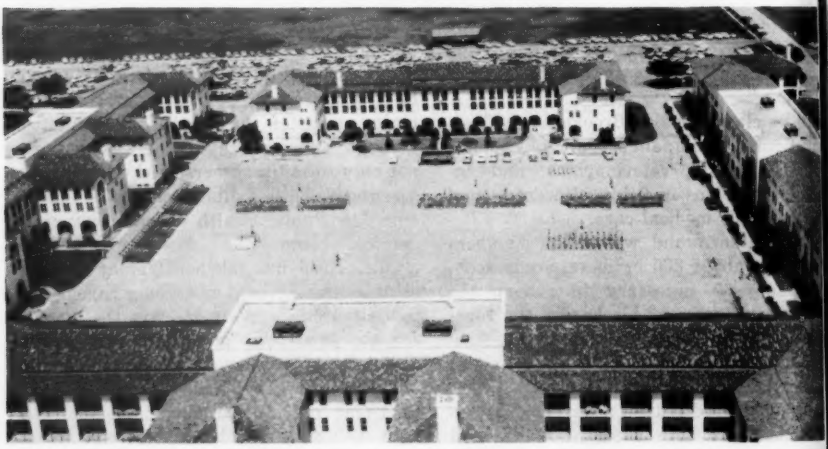
Instruction at the school ranges from these enlisted courses to hospital administration studies leading to a Master's degree through the school's affiliation with Baylor University in Waco, Texas. The school has been called "The Army's Medical University."

The advent of nuclear and thermonuclear warfare has brought the possibility of many thousands of casualties created simultaneously, and the Army Medical Service's program for caring for such a major disaster has been disseminated through a concentrated one-week course not only to military personnel, but to representatives of civilian schools of medicine, US Public Health officials, and civil defense agents.

The school has taken a leading role in establishing minimal emergency care needs to be taught to every man in the Army, for the first few "golden moments" are those when lives may be saved by prompt action since the exigencies of modern warfare may preclude a trained medical aid man being at hand immediately. Thus early survival will depend largely on the care each man can give to himself or to his buddy. Great emphasis also is given to emergency field medical procedures for all newly commissioned physicians.

Even though the Army Medical Service came into being to care for soldiers injured in battle, there is now an equally important responsibility for both peacetime and wartime. This is the prevention of diseases and accidents that cause lost man-hours,

Members of the course in Management of Mass Casualties hear explanations of field medical operations



Aerial view of United States Army Medical Service School Quadrangle

and more and more importance is given to teaching these measures at the school.

In addition to instruction given to officers and enlisted personnel in residence at Brooke are thousands of correspondence courses sent out to Army Medical personnel throughout the world, and instructional guides sent to US Army Reserve and National Guard schools throughout the Nation. Other Reserve units come to the center on active duty for training only.

There can be no question of resting on the laurels of past accomplishments for personnel at the Army Medical Service School. Instead, the quest goes on day in and day out to find the best method of rendering medical assistance as demanded by the changing needs of modern warfare.

Students in hospital administration check working blueprints against a block model

Surgeon checks physical condition of a casualty at a sorting station in a field demonstration of mass casualty care

THE United States Army Ordnance School, located at Aberdeen Proving Ground, Maryland, conducts individual training of selected military, allied military, and civilian personnel in the fields of ordnance materiel and operations, as prescribed by the US Army Ordnance Training Command.

Formal officer training began in 1902 with the establishment of an Ordnance School of Application at Sandy Hook Proving Ground, New Jersey. In 1906 the school was transferred to Watertown Arsenal, Massachusetts, and remained there until 1932. In 1932 the officers' school was transferred from Watertown Arsenal to Aberdeen Proving Ground.

Formal schooling in the second training field, training of enlisted specialists, began in 1917 when a number of separate specialist schools were established throughout the United States. After World War I these courses were brought together in 1919 at Raritan Arsenal in the Ordnance Field Service School and in July 1940 moved to Aberdeen Proving Ground.

The Ordnance School was redesignated effective January 1957 as the United States Army Ordnance School.

The Commandant is responsible to the Commanding General, United States Army Ordnance Training Command, for accomplishment of the United States Army Ordnance School mission.

The school is organized into the following divisions: the Fire Control Training Division, the Ordnance Supply Training Division, Materiel Training Division, Ordnance Service Training Division, Military Training Division, and the Nonresident Training Division.

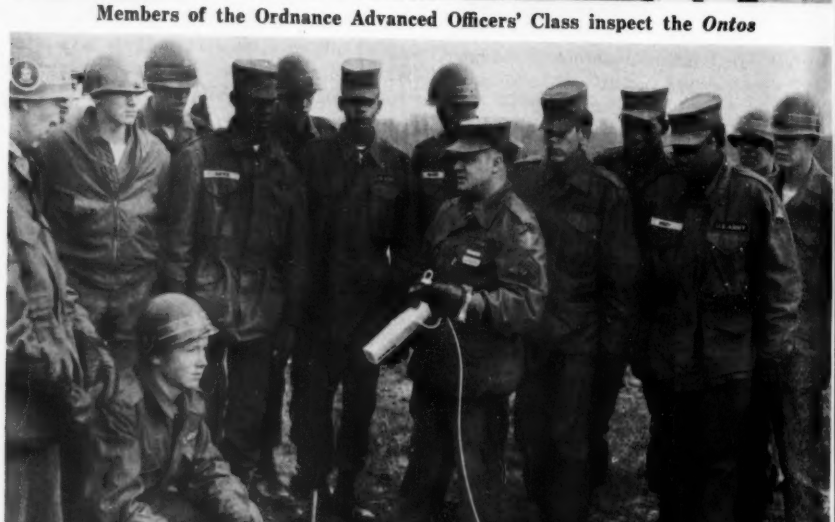
The US Army Ordnance School teaches officer and enlisted courses which fall into two categories—managerial and technical. A comprehensive group of technical courses includes such subjects as automotive maintenance, fire control, armament maintenance, and ammunition supply.

The school motto *Addere Flamman* meaning "To Add the Flame," symbolizes the school's mission—to instruct and impart the flame of knowledge to its student body to the end that each graduate possesses the qualities necessary to progressive development throughout his career.

Hoisting a jeep with an *M62* wrecker truck

ROTC cadets watch a vehicle parade during their visit to the US Army Ordnance School

Members of the Ordnance Advanced Officers' Class inspect the *Ontos*



A typical nonelectric method of detonating explosives is explained to an enlisted class

THE mission of the United States Army Quartermaster School is to conduct the Branch Service School Training Program of the Quartermaster Corps including resident and nonresident instruction; to develop and formalize doctrine; to develop and prepare Quartermaster Tables of Organization and Equipment; and to provide training material. The school now offers 73 courses covering all aspects of Quartermaster responsibility—from the Quartermaster officer who is pursuing a 32-week career course to the enlisted man attending a three-week general supply specialist course. Students come from every branch of the Army and from the Navy, Air Force, Marine Corps, and allied countries.

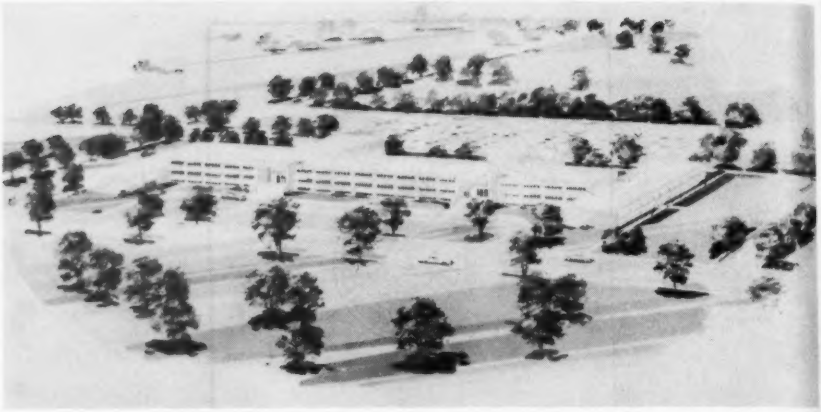
Organizationally, the school encompasses two major areas of interest—instruction and supporting administrative services. The Commandant's immediate staff includes the Assistant Commandant, the civilian Educational Advisor, the Director of Instruction, the School Secretary, the Director of Instructional Aids Department, and the Director of Program and Budget.

The Director of Instruction directs the Branch Service School Training Program —the school's main business. The principal operating elements are the departments of petroleum, subsistence, airborne, maintenance, operations, supply, and nonresident instruction.

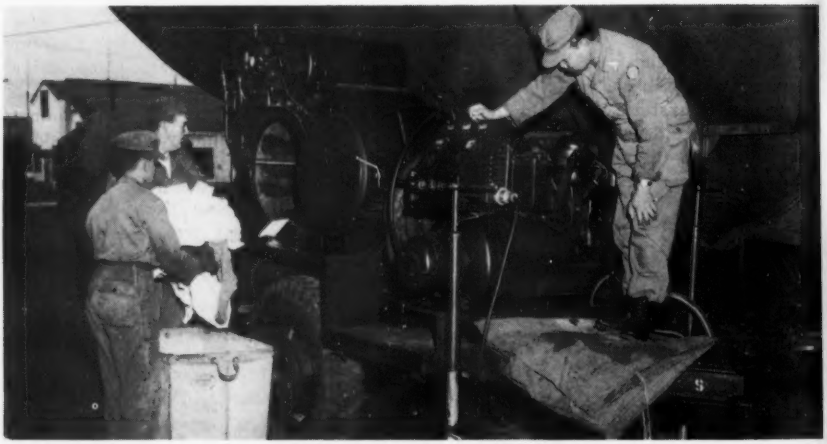
The Assistant Director of Instruction for Organization and Doctrine Development supervises all activities which prepare QMC training literature, and is also responsible for developing Quartermaster Corps doctrine.

The Assistant Director of Instruction for Training exercises staff supervision over all activities engaged in the preparation and presentation of resident and nonresident academic instruction.

Basic and advanced officer career courses provide branch training to officers so that they will be thoroughly familiar with the duties and responsibilities appropriate to their grade. For enlisted personnel, resident courses provide basic and advanced training in the specialist responsibilities of the Quartermaster Corps; for example, general warehousing, office machine repair, shoe repair, and petroleum products analysis. The curriculum also contains two-week courses for mobilization designee re-



Artist's drawing of new Quartermaster Academic Building



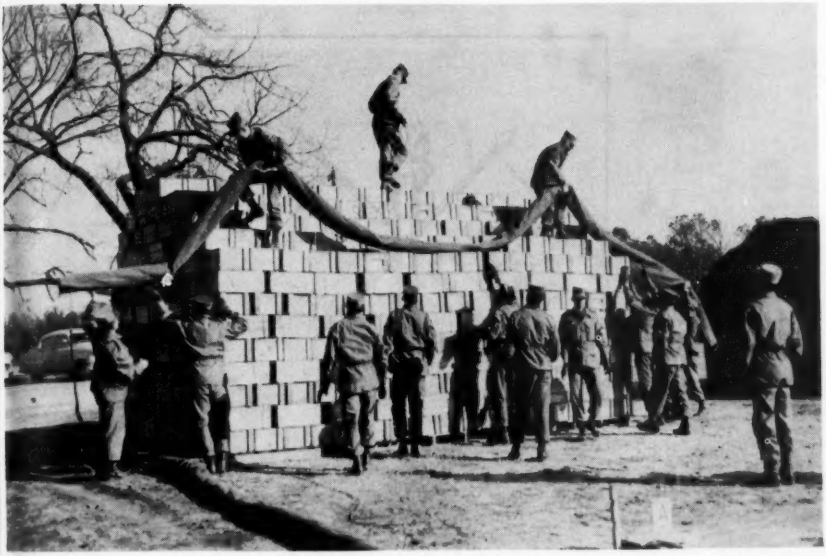
Instruction in operation of a mobile laundry unit

servists to provide refresher training in new Quartermaster Corps developments.

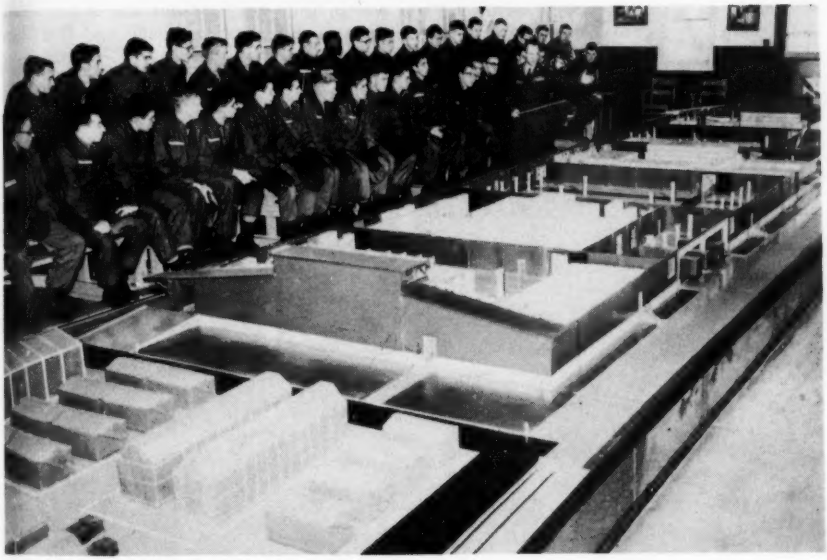
The Nonresident Instructional Department administers the Quartermaster Army extension course program in which 4,700 students are currently enrolled. Other phases of nonresident instruction include support to the USAR school program, ROTC program, and the Reserve components staff officer training program.

The school provides instructors who participate in the summer training programs of the United States Military Academy, United States Army Reserve, and the Reserve Officers' Training Corps.

In order to serve the ever-expanding Quartermaster Corps training mission, a large, modern school plant, as illustrated, complete with closed television circuit, will become available at the end of this year.



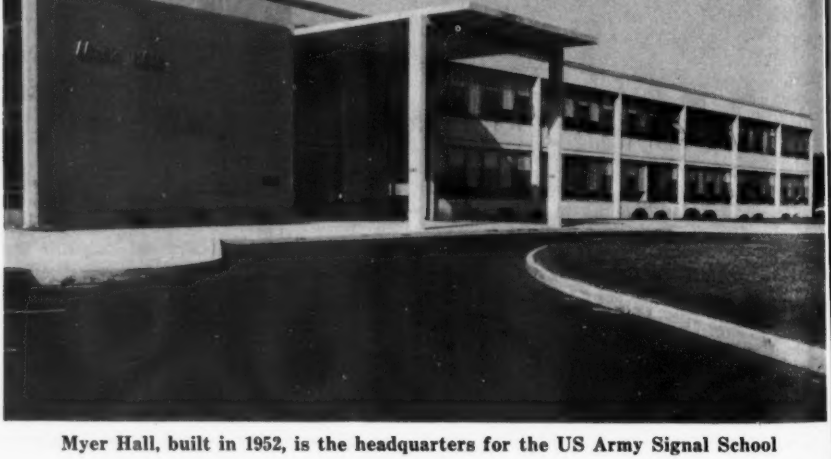
Outside storage training



Model warehouse

THE United States Army Signal School provides progressive military education and appropriate practical training for selected officers to prepare them to perform efficiently in all positions concerned with leadership of Signal Corps troops, and with doctrine, tactics, logistics, and techniques applicable to the Signal Corps.

In 1905 the Army Signal School for officers was established at Fort Leavenworth, then the home of the Army Staff College and the Army School of the Line.



Myer Hall, built in 1952, is the headquarters for the US Army Signal School

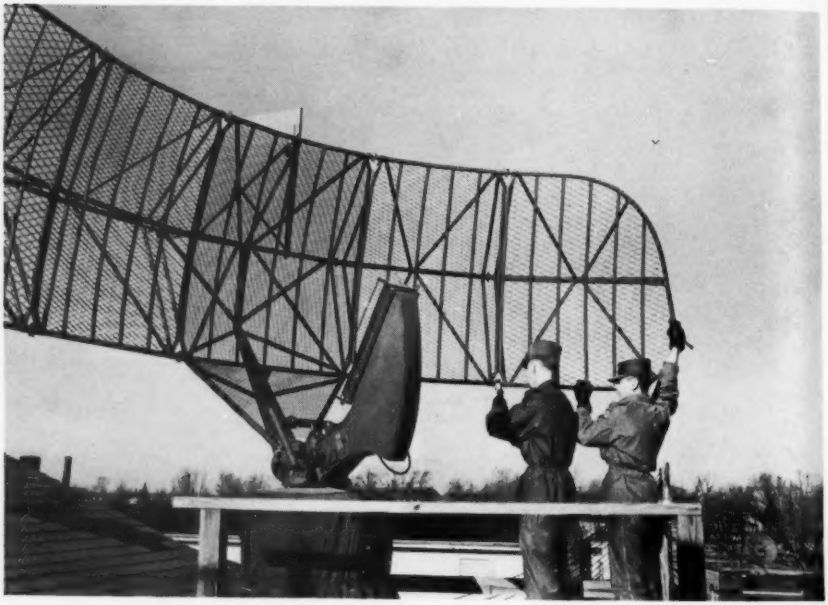
Students in a Radio Repair Course troubleshoot radio sets to discover and correct built-in faults as part of their class instruction

This marked the beginning of signal training as part of the Regular Army's general educational system, and was the first attempt to educate command and staff in the employment of their communications.

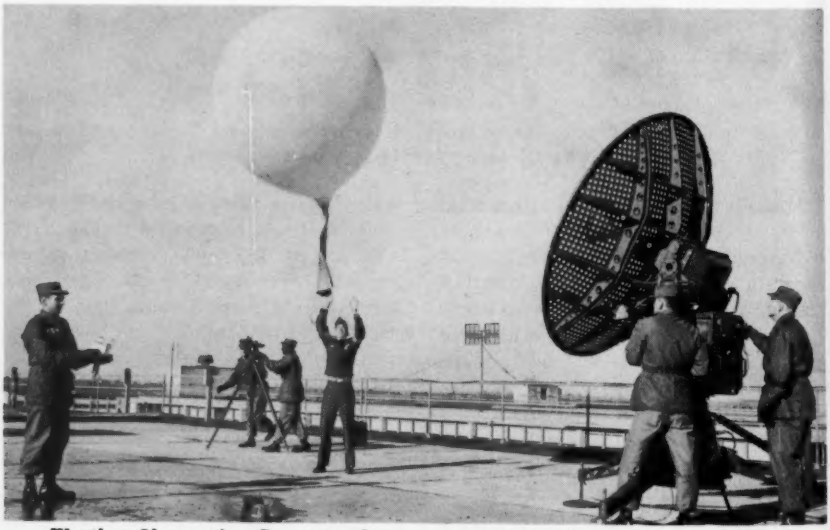
The most significant development in signal training during World War I was the establishment, in June 1917, of a replacement training center in Monmouth County, New Jersey. By 1920 all major Signal Corps activities were centered in this area In 1925 Camp Alfred Vail, as it was first called, was made a permanent installation and renamed Fort Monmouth. Here, through years of gradual growth, developed the present home of the Signal Corps.

Of a total of 432,000 officers and men trained under Signal Corps supervision during World War II, more than 20,000 officers received training at Fort Monmouth.

As Signal Corps operations continue to grow more complex, training needs grow more exacting. The impressive establishment that is now the US Army Signal School is an index of the ever-increasing importance of scientific military training to the survival and progress of our Nation.



Students in the Radar Repair Course adjust radar antenna

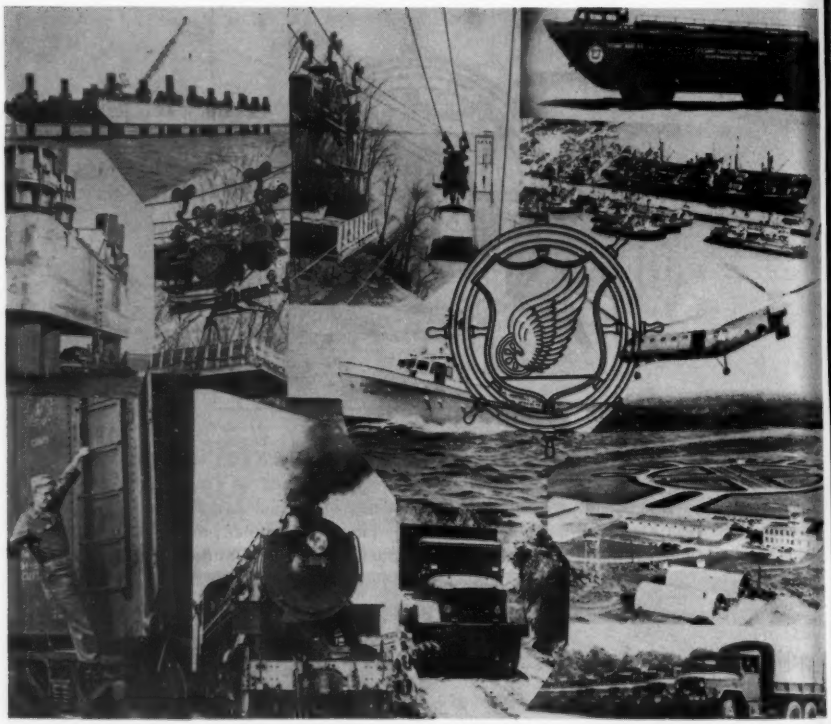


Weather Observation Course students prepare to launch a radiosonde balloon

THE United States Army Transportation School conducts resident instruction and provides nonresident instruction to selected individuals, assists in the development of doctrine, organization, and techniques applicable to transportation activities, and prepares training literature and tables of organization and equipment.

The establishment of the Army Administration Officers' Candidate School Number

Shop area of the United States Army Transportation School



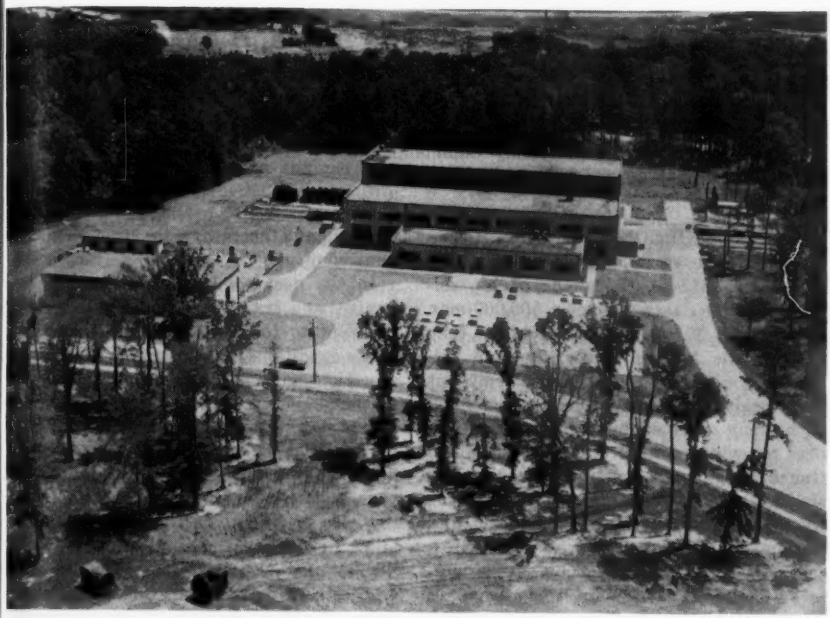
A montage of types of transportation used by the Transportation Corps

4 at Mississippi State College, Starkville, Mississippi, on 18 October 1942 marked the beginning of the school now known as the US Army Transportation School.

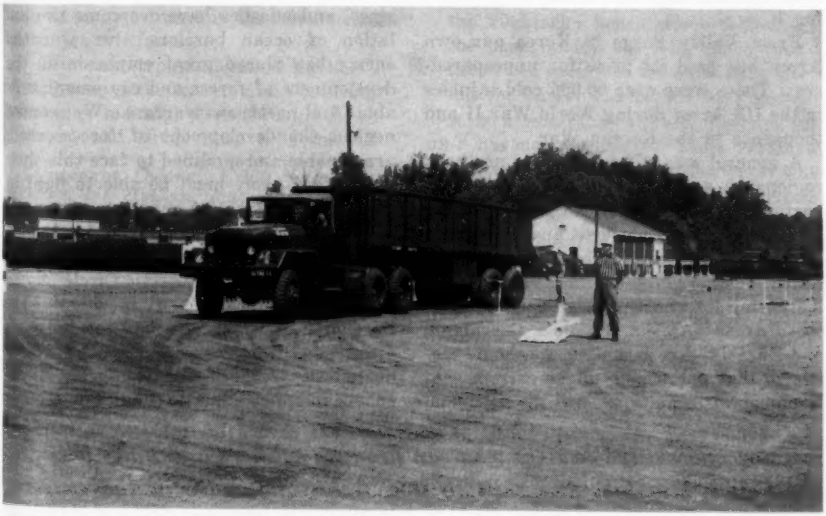
On 9 January 1946 Fort Eustis was established as an installation under the Chief of Transportation. The school was located there and renamed the US Army Transportation School. The first Regular officer course began on 4 November 1946.

During January 1947 the mission of the school was further broadened to include specialist training and Regular officer courses. In June 1954 the first of several Army Aviation Maintenance Courses began. This represented a new field for the Transportation Corps, one which has since expanded to prominence in the US Army Transportation School mission.

Recent years have brought numerous changes which include an increased emphasis on Army aviation maintenance instruction, new concepts in transportation movements, new developments in communications, integration of Transportation Corps units into our fighting divisions, and new techniques and organizations generated by our entrance into the nuclear age.



Aerial view of the Rail Department Shop of the US Army Transportation School



A Transportation Corps driver goes through a parking test

WINTER WARFARE

Lieutenant Colonel Erkki Lahdenpera, *Infantry*
Faculty, U. S. Army Command and General Staff College

AS NAPOLEON'S *Grande Armée* marched homeward from Moscow in the winter of 1812-13, thousands of his soldiers froze to death. Out of a 500,000-man army only 30,000 remained when they reached the Niemen River. Russian soldiers did not defeat Napoleon's army but the Russian winter did. History is filled with many other examples of unpreparedness for winter warfare. The British 14th Guard Brigade's attempt in 1940 to assist the Norwegians failed because the troops were without winter training and equipment. Hitler's offensive against Moscow in 1941-42 was halted by severe winter climate. The German Army was not prepared for winter warfare; it was neither organized, equipped, nor trained for it.

From Valley Forge to Korea our own Army has paid its price for unpreparedness. There were over 90,000 cold injuries in the US Army during World War II and thousands in the Korean War.

A general war will involve the northern regions as a strategic area of great importance. Approximately 45 percent of the North American Continent and 66 percent of Eurasia fall within boundaries of so-called northern regions. In view of the increasing international significance which these areas—Alaska, Canada, Greenland, and Eurasia—are assuming, we should recognize that operations under extreme environmental conditions will be common, normal, and necessary to accomplish the final victory.

In the past we had time to equip, organize, and train our troops, particularly those units to be used under severe climatic conditions, as in the mountains. This situation has changed. Never again will we have the time that World War I and World War II gave us. In the next war we will not be in a relay race; we will not have time to warm up and then act as a strong anchor man in a last lap of the race to defeat the enemy. We and our allies now stand together in the starting line against the aggressor. The first lap on the track may take us into the cold and snow. We must be able to react immediately and effectively. Airplanes, submarines, and missiles have overcome the isolation of ocean barriers. Our potential enemy has placed great emphasis on the development of forces and equipment suitable for northern warfare. We cannot neglect the development of forces which are capable and qualified to face this challenge. Our Army must be able to fight in cold and snow *better* than our opponent.

Northern operations are not conducted on or north of a certain latitude, such as the Arctic Circle. The Arctic Circle has no military significance; it is merely the line north of which one may see the midnight sun. Northern operations are conducted in areas of the Northern Hemisphere in which climatic conditions require

Trained and skilled leaders who can produce soldiers and units with the endurance, stamina, and skill to live, fight, and move in the extreme snow and cold are requisites for successful operations in winter warfare

special training, techniques, and equipment. These operations occur in both winter and summer including the spring break-up and fall freeze-up periods. Each presents its own peculiar problems.

Troops well-trained for winter warfare adjust themselves easily to summer conditions in the Far North. The opposite, however, is not true. Experience has proved that units cannot be committed successfully to winter operations without special training. Technological improvements, as air mobility and mechanization of ground movement, reduce the problems of winter operation. However, no matter to what degree a unit is air mobile or mechanized, the vehicles cannot carry the fight to the end in the northern wilderness. For instance, weather often prevents air activity for days. If two forces are otherwise equal, the force with the superior individual mobility will always have the greater potential for success. This force can move cross country faster and farther dismounted if the situation so requires.

Let us observe an imaginary march cross country of a unit not properly trained and motivated in the fundamentals of winter warfare:

> The men struggle against the blowing snow in the extreme cold crossing an open muskeg, push through dense woods, and climb steep hills instead of simply bypassing them. Their *bulky* clothing, the *heavy packs* they carry, and the *overloaded* sleds they pull slow the unit. Rucksacks are loaded with double sleeping bags and many other "nice to have" items. The over-snow vehicles towing overloaded cargo sleds have *bogged down* in gullies and creek beds into which deep snow has drifted, because the route the unit selects *has not been reconnoitered* previously *by a trailbreaking party on skis.* The parka hoods cover the faces of the soldiers so they are *unable to observe* anything. Soon many members of this unit become *overheated* and *dehydrated* followed by *exhaustion.* These individuals do not have necessary endurance and stamina. Some men lag far behind and among them are many who suffered *frostbites,* most of them with frozen toes and fingers. *Major difficulties* are encountered. *Slowness* of movement, caused by lack of trailbreaking, and problems of *navigation* and *security* are the worst. Weapons are attached to the rucksack; hence when removing the pack during the halt, many men throw the pack into the snow thus filling the barrel and breech with snow.

It is a miserable picture. Perhaps *one unit* has never made *all these errors at one time,* but this description represents some of the major fundamental shortcomings in winter training. A former commanding general of the US Army, Alaska pointed out in the *Army Information Digest* in January 1959 that the lessons learned in World War II and the Korean War showed that the Army's capabilities for combat were weakest in cold weather climates.

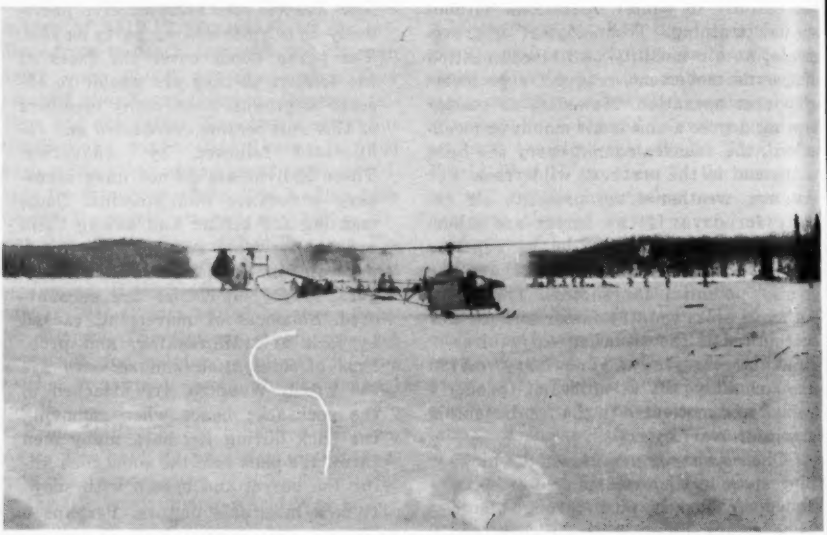
Since 1947 the Army has conducted annual winter exercises. They have been rather small-scale operations and consequently, a very limited number of troops have received this training. Great improvements have been made in many areas, but,

---

Lieutenant Colonel Erkki Lahdenpera received his civilian and military education in Finland. During the Finnish-Russian wars and the Finnish-German campaign he served as Regimental S3, Division G2, and three years as an infantry battalion commander. In December 1947 he joined the US Army. His assignments include duty with the Mountain Training Command in Colorado, and the Yukon Command in Alaska. He was a member of the Training Literature Department at the US Army Infantry School; has been assigned as technical advisor in the preparation of training films; and participated as an umpire and advisor in several winter exercises. He was assigned to the faculty of the U. S. Army Command and General Staff College in October 1957.

as will be explained later, the results have not been as good as were expected.

The chief factor limiting the development of the art of winter warfare and northern military power is the *man* himself. Man's skill, physical and mental endurance, and morale still are the most important factors in war. There can be no excellent unit without excellent men, *and the man untrained in winter warfare becomes a great burden, not an aid, to the unit in cold and snow.*



H-21 (Shawnee) helicopters land on a lake to pick up troops during Exercise *Caribou Creek*, 1959

Basic Errors

The men whose conduct during the march was described above made errors which have been repeated year after year in the winter exercises. These shortcomings have been pointed out in official maneuver reports, organizational training circulars, and oral critiques by the commanding officers. Why are these fundamentals still being violated? An examination of the most common errors and the methods to overcome them should prove of value.

Overdressing

Overdressing affects mobility and endurance of an individual. Our winter clothing is, perhaps, the best in the world; abundance of it often is a problem. When men wear parka with liner and hood during a ski march, the result is excessive loss of body moisture and consequent exhaustion. The reason for the overdressing is the desire to feel comfortable *at the start of the march.* This is unnecessary since advantage can be taken of short rest periods during the march to adjust clothing. Heavier clothing should be carried in rucksack and donned during the halt. The hood which has become a symbol of Alaskan beauty queens is necessary for a soldier only in a heavy, cold wind. The hood impairs vision and hearing; use of ear flaps of the pile cap, however, allows the man to see and hear.

Actual experience and scientific tests

have proved that it is virtually impossible to provide sufficient clothing to keep a man warm. Exercise and muscular activity are necessary. However, men in poor physical condition do not have the endurance to maintain a proper thermal balance. Consequently, overdressing and lack of physical fitness are closely associated.

Dehydration

Dehydration and consequent exhaustion is another problem. In a warm climate an individual is easily aware that he is losing body moisture through perspiration. In a cold and dry climate, as in the Far North and in the mountains, the loss of body salt and fluid remains unnoticed by an inexperienced person. Only during heavy exercise does his clothing become wet through perspiration, especially if he is overdressed. The body becomes dehydrated unnoticeably and this leads to fatigue and exhaustion. The simple remedy is to drink a sufficient amount of water. Water supply actually is no problem in the North; there is water everywhere. Human lethargy must be overcome, and if no other water sources are available, the technique of melting snow and ice must be learned. It is a slow procedure but it prevents dehydration.

Overloading

Overloading vehicles, cargo sleds, and particularly individual packs and 200-pound sleds (ahkios) has decreased the mobility and efficiency of units during winter exercises. If an individual rifleman wears and carries all the clothing and equipment which the tables of organization and equipment (TOE) deems necessary, he has more than 100 pounds of load consisting of over 100 pieces of equipment. This does not include his weapon and ammunition, but contains many "nice to have" items. There have been cases when a unit commander ordered his men to carry both parka and field jacket with liners. A problem of plenty! Troops should be equipped efficiently but lightly. An excessive load soon will exhaust even well-trained troops.

An example of a glaring fallacy is the hauling or carrying of sleeping bags when encountering the enemy is imminent. If troops have the mission to close in and destroy the enemy, they should accept the fact that they are going to the objective to fight and not to sleep. Consequently, they should carry ammunition but not sleeping bags. At the same time, a warm-up tent with stove per platoon, or one tent per two platoons, permits continuity of effort by rotating men through the tent in the extreme cold, even in an offensive action. The fact that the heated shelters are indispensable to preserve the fighting ability of the troops should not lead into overloading the oversnow vehicles and sleds with *all* the tents and stoves available. The use of warming tents in the extreme cold is one of the basic "secrets" of winter operations. Units should reduce their loads to bare essentials to maintain oversnow mobility.

Light Unit Test

In 1956 the 4th Infantry, US Army, Alaska, conducted two mobility tests comparing the functioning of a TOE equipped and a "lightly" equipped ski unit. The temperature varied from minus 9 degrees Fahrenheit to minus 54 degrees Fahrenheit. The lightly equipped unit did not carry sleeping bags, air mattresses, gasoline cans, or water cans. This unit covered 100 percent more distance than the TOE equipped unit during the three days the tests lasted. The "light" unit used one 10-man tent with stove to house 15 men. These men received sufficient rest, were not too cold to sleep, nor too crowded when eating. Considering the number of men who must act as security force and in patrols, one tent often is sufficient to shelter one platoon. This is spartan living but the mobility attained justifies drastic means. The morale of the TOE equipped unit declined, overloaded packs and sleds slowed it, and after each day's march it

was not in condition to fight, as was the "light" unit. The members of the "light" unit enjoyed the training, lived better, and were happier.

Cold Injury

There is no clothing, footgear, or handwear developed which will keep an *inactive* man from receiving cold injuries in extreme cold. The danger increases if the inactivity is preceded by strenuous physical activity, such as a ski march. The misconception that clothing *alone* will protect the man has caused thousands of frostbites in the past. Although only a small part of the Army fought in the Far North, approximately 20,000 of the injuries were frostbite cases; the rest included trenchfoot and other injuries which are typical in wet, cold climate. According to "Cold Injury, Ground Type," published by the Office of the Army Surgeon General in 1958:

These losses occurred, as is repeatedly pointed out in this volume of cold injury, because the lessons of the past were not learned.

There are no absolute excuses for the epidemics of cold injury, because the lessons of the past were not learned. (*Emphasis added.*)

Scientists have obtained evidence that the mental state can determine to a considerable extent how the body will be affected by extreme cold. A study by Arctic Aero Medical Laboratory indicates that: "The response to cold seems to be subject to the action of the higher levels of the brain, and the mechanism is a complex one." Fear of cold is common among men who have not grown up in a cold climate. This fear can be overcome easily by the process of learning, experience, and acclimatization. One can be highly effective in his work without being comfortably warm. The absence of complete comfort can even increase man's effectiveness.

Prevention of frostbite is a vital part of individual training. Serious frostbite cases (second and third degree) most often are caused by ignorance, negligence, and lack of supervision. However, anyone exposed to high wind and extreme cold can get a first-degree frostbite which causes no permanent damage if warmed up by body heat immediately. Inexperienced leaders and aid men have caused a first-degree frostbite to deepen into second or third degree by ordering men with white spots, the symptom of first-degree frostbite, on cheek or nose to proceed to an aid station instead of simply warming the affected area immediately.

Serious frostbite may result in permanent damage despite optimum treatment. Prevention includes self-reliance and initiative by the individual, *proper* use and change of clothing, exercising the muscles of the face, fingers, and toes from time to time, and the use of the "buddy system" in detecting frostbites.

Physical Fitness

In few environments is the physical fitness of a soldier as important as it is in the Far North in wintertime. It is the key and foundation for getting along. An individual must be in good physical condition not only to negotiate rough terrain and long marches, but also to prevent cold injuries. Physical fitness often may be the factor which prevents an individual receiving a cold injury. As previously stated, in case there is no shelter and heat, the only possible way to avoid cold injury is muscular exercise. Inexperienced persons tend to stand still until they are chilled.

The executive director of the President's Council of Youth Fitness said in 1958:

Spectatoritis is the Nation's number one fitness problem. I was at the recruiting station recently, and the doctors there told me they've detected a new ailment—heel fractures among soldiers learning to march. They haven't used their legs enough to be ready for the exercise they get in basic training. We do too much sitting and looking when we should be out doing.

It has been said that we are getting soft and that mental and moral deterioration follows physical softness. However, the picture may not be as dark as it looks at first glance. Experience of winter exercises shows that American young men respond well to a given challenge.

Some troops, such as members of airborne units, have been in exceptionally high physical condition in the Alaskan winter exercises. This fact has provided an excellent foundation for efficient training. Good results have been obtained both in individual and unit cross-country mobility. In general, the individuals who have experienced strenuous exercise to the point of exhaustion, either in work, in sport, or in the Army, adjust themselves easily to rigorous winter warfare training. Rangers, distance runners, skiers, mountain climbers, and other outdoor men belong to this group. They know that a human being is able to go far beyond the "fatigue point" since he has a reserve stock of energy. They have learned that if one just keeps working, he will get his second and even a third wind. They have self-confidence and reliance on their capabilities. Men coming from homes and circumstances where they have been well-fed, protected from cold and wet, and who have avoided exercises which require stamina and endurance generally are not good material for "ski troopers."

Leadership

The key factor in building a good winter combat unit is leadership. In no other environment is the necessity for strong and competent leadership more important than in the extreme cold and snow. It has been noted in past winter exercises that the poor example of the leaders, and their careless remarks about personal inconveniences caused by cold, created a mental obstacle which had to be overcome before constructive training could take place. A general who once served in Alaska told the troops that as soldiers they should be happy anywhere they have the honor to serve their country.

Good leadership is difficult to build when rotation prevents leaders from receiving sufficient experience. It is apparent that during the first year in a northern duty assignment an officer hardly learns the fundamentals. During the second year he actually is on the advance level of training, and not until his third year is he able to give his best to the troops.

There are officers who feel that a field grade officer does not need to have practical experience in the fundamentals of winter warfare training. All he needs, they maintain, is to observe and to listen. Nothing is farther from the truth. Academic experience alone will not produce capable leaders. A US Army general who fought in the tropics during World War II said that no one who has not had practical field experience in the jungle can begin to explain it to others. This applies also to the Far North.

Only by personal experience can an officer gain the knowledge and skill required to plan, organize, and conduct operations successfully in the northern wilderness. Therefore, it is preferable that officers who have field experience be assigned to a planning staff for winter exercises. At present, however, this is difficult. The winter warfare training of officers is not sufficient to produce specialists, and we need specialists if our units are to operate successfully. Staff officers may do "fine reasoning" and headquarters may issue perfect orders, but if the officers lack the field experience, they will be less able to assist the commander in supervision and correction of errors.

An officer inexperienced in winter warfare becomes, as often has occurred in past winter exercises, "vehicle or shelter bound." Such an officer is not able to make sound decisions in tactical situations, and is unable to evaluate the mental and physical condition of the troops.

Many officers are not prone to partici-

pate voluntarily in the toughest part of training, for example, ski races, because they feel they may be "outplayed" by men lower in rank or grade and hence lose prestige. However, they should participate in competitions remembering that the situation is worse when officers do not participate at all.

Vigorous, enthusiastic leadership is necessary to correct weaknesses in winter warfare preparedness. It is by the officers' example of spirit and display of courage —whether on the field of friendly strife or on the field of battle—that brings success. The power of example cannot be overestimated.

Team ready to move out on nontactical march

Prejudice against cold and snow has been an additional obstacle against proper attitude in this field. It is unpleasant to think of winter warfare, cold, and snow. Our military writers seldom emphasize the military significance of northern regions. Military schools and colleges have either nothing or a very minimum number of hours of winter warfare subjects in their curriculum. National Guard and Reserve units have no winter warfare training nor equipment which would allow them to conduct any field training in northern states. As a result, commanders and staff officers lack the necessary background and knowledge and are compelled to make important decisions affecting winter equipment, training, tables of organization, and, finally, strategy and tactics. The consequences may be serious. Field Manual 31-71, *Northern Operations*, states: "One who lacks practical field experience in the North cannot appreciate the conditions nor the measures necessary to overcome them."

Equipment versus Training

It is vital to have good equipment, but too much time, effort, and funds have been

devoted in the past to testing and experimenting with new items of equipment and clothing *at the expense of combat training.* In extreme environmental conditions it is far more important to have well-trained troops with satisfactory equipment than average troops with excellent equipment. First-class training with a high state of morale is the foundation for successful operations in rugged terrain and extreme climates. This is not to say that we do not need the best possible equipment, but the primary effort must be on tough, realistic combat training. Wartime experience showed that success depended more upon the knowledge of how to use available equipment than upon the equipment itself.

An example of endless experimentation and testing without standardization is the search for a perfect oversnow vehicle which would be suitable for reconnaissance, communication, and have a limited cargo carrying or cargo towing capability. If the ground pressure of a vehicle is very low, the carrying or towing capability is limited. If this capability is increased too much, the vehicle becomes a through-snow vehicle or perhaps an "undersnow" vehicle. It is possible that the tests conducted will not produce a "perfect" vehicle in the near future. Therefore, we should have one test vehicle standardized and made available for training. Training of drivers and mechanics in the environment of cold and snow is more important than small differences between vehicles.

Skiing and Snowshoeing

One of the common misconceptions is a belief that ski training makes a winter soldier. It is true that infantry units on skis still have a vital role in mechanized warfare in winter. However, skiing is only a means of transportation to get units from one place to another in good condition. The armies of the northern countries, where every man learns to ski in his childhood, devote the main part of the winter to special techniques and tactics of winter warfare rather than skiing per se. In the United States and Canada skiing is not a national sport. From a military viewpoint this is a great handicap. Downhill skiing with modern ski lifts, as practiced in ski resorts, is only a part of the military skiing requirement. Therefore, the Army has to teach cross-country skiing to its personnel before actual winter warfare training can take place. It takes time and effort.

Often the question of skis versus snowshoes is taken up by those persons who do not have extensive experience in both means of movement. Choice between the two methods depends on the state of training. A report of a recent winter exercise states:

All rifle company commanders unanimously favored the use of skis rather than snowshoes because of the speed, mileage, and physical condition of the men.

Troops on snowshoes are inferior in mobility. Snowshoes do not have any sliding capacity but the skier slides on level terrain, downhill, and even on gentle uphill slopes. When the potential enemy is employing ski units, we also must be proficient in their use. Snowshoes have their place for use by those elements which do not follow the infantry, or when there is no time for specialized ski training. Depending on the physical fitness and past experience, four to eight weeks' training time is necessary to make men sufficiently proficient in the use of skis. Use of snowshoes is learned within a day or two.

Special Training Required

Turning to unit training, the first concern is to teach *movement cross-country* as a unit. This is done by long ski marches to overcome "the fear of mileage" which is a complex of man of the motorized era. It deprives man the confidence in his own capabilities. A unit must gain this confidence. In the northern wilderness in deep snow the unit cannot develop its full combat power unless it is able to move cross-

country, and speed depends on the slowest man. It also depends greatly on the efficiency of the *trailbreaking* party. Trailbreaking in deep snow and variable terrain is hard work and requires extensive practical experience.

All personnel operating in the northern wilderness must be proficient in *ground navigation*. Absence of landmarks and long periods of darkness are often listed as limiting factors for mobility. This applies to an untrained unit. If personnel are well-trained in ground navigation, the absence of landmarks will not slow the unit. By using dead reckoning the unit can advance as rapidly as in any other terrain and be aware of its location at any time. Long periods of complete darkness also cause misconception. Winter night with northern lights and reflecting snow in the Far North is very seldom dark; it is just a long twilight, and night operations should be accepted as normal. Magnetic distubances and the tendency to overestimate distances are blamed when units fail in navigation. There are very few places in the North in which a magnetic compass is not reliable for *ground* navigation. The human error is the most common cause of failures. Overestimation of distance also is a question of state of training.

When a unit must move a long distance and there is an insufficient number of vehicles available to motorize or mechanize the entire unit, *skijoring* can be used. One or two squads on skis can be towed behind a vehicle using a long rope. This special means of transportation is easy to learn; however, troops on snowshoes cannot use this means.

Reconnaissance by patrols has seldom reached given objectives. Even patrols with short-range missions have not succeeded in accomplishing their missions. The primary reasons for the failures have been poor planning, insufficient training, and lack of physical stamina of patrol members. Long-range ski patrols and raiding units—100 to 150 miles behind enemy lines—operated successfully during World War II. These units were composed of men who possessed excellent physical condition, high morale, and proper motivation. Only through realistic training can we produce similar units. The importance of long-distance patrols will increase in the future. Their use for target acquisition might be the most efficient means of finding nuclear targets. It is naturally advantageous to furnish these patrols or raiding units ground or air transportation to a certain starting point, but use of vehicles in the actual operation behind enemy lines is questionable. The patrols must leave behind everything not vitally important and be equipped with modern, very light radio sets.

Other areas which require extensive special training are fighting techniques in deep snow, and field fortifications and camouflage in snow and frozen ground. If the enemy is expected to use nuclear weapons, the units must dig into frozen ground. Since ordinary entrenching tools will not be suitable for accomplishing this, special equipment is needed. Construction and maintenance of temporary winter roads without engineer support must be learned. Seldom, if ever, is snow cleared on these roads; rather it is compact. This reduces the tendency of drifting snow accumulating on the road. Improvement of these routes later into wheeled vehicle roads could be an engineer responsibility. Methods of reinforcing ice is a necessary subject, as is that of ice mining, an opposite action. If ice drilling equipment is available, the numerous lakes and rivers in the Far North can be denied the enemy as routes.

Artillery, armored, and engineer units require additional specialized training in their own areas. Medical units must learn speedy evacuation in the extreme cold. Communication problems are magnified in snow and cold and special training for communication personnel is essential. Dur-

ing the winter maneuvers the messenger on skis often has been the only communication means available when radios did not function.

These are examples of only a few subjects in which troops participating in winter maneuvers have been insufficiently trained.

Improve Leaders' Training

Most of our officers have little or no knowledge of the fundamentals of winter warfare training. A well-rounded Army officer should be given the opportunity to acquire the basic rudiments of this field. Army schools and units must not be relied upon to train these men at the outbreak of war—*it is too late then.* Officers should be prepared to conduct this training now. Therefore:

1. Curriculums of the Reserve Officers' Training Corps program, Officer Candidate Schools, and the United States Military Academy should include fundamentals of winter warfare. In the Northern States this instruction could consist of practical field training.

2. Regular Army officers' requirements should include skiing ability. At the present time either ranger or airborne training is required. Skiing skill would make him well-rounded and capable to cope with a new environment.

3. Army branch school *basic courses* should concentrate in their particular areas. For example, the Ordnance School should teach techniques of maintenance in extreme cold and snow and the Infantry School those basic techniques and knowledge which are commonly violated in the individual and small unit winter training.

4. *Advanced courses* of the branch schools should give officers *advanced instruction* in the application of tactical principles.

5. Based on the inclusion of suggested instruction in lower schools, the *higher military institutions* could then achieve better results in their educational mission in this field. An input of students knowledgeable in individual and small unit techniques would enable the United States Army Command and General Staff College to reduce the time required for familiarization and devote its available time in combined-arms operations in the North.

6. Unit commanders and higher ranking staff officers should participate in premaneuver cadre training. If only the junior officers and noncommissioned officers take the course, as often has been the case, they are placed in a difficult position. If they desire to do their job, they must "supervise" their leaders throughout the planning phase and actual exercise to avoid "fumblings."

7. The number of officers and noncommissioned officers attending the US Army Cold Weather and Mountain School in Alaska should be increased. Presently only 100 officers outside of Alaska receive this training annually.

Expand Troop Training

After the leaders' training previously outlined has been in effect for a sufficient time, the training of troops would rapidly bring about good results. However, something must be done to increase the number of units receiving winter training. Two battle groups stationed in Alaska are able to conduct continuous training. Normally, only one additional battle group with its inexperienced leaders participates in the annual winter exercise with the troops stationed in Alaska. Then it returns to its home post where the environment does not allow the continuation of perhaps well-started, but too short, winter training.

What can be done? There are simple solutions.

1. A permanent type of training center should be established in a Northern State where climatic and terrain conditions are suitable for winter training. This training center could be located either in Montana, Minnesota, Vermont, New Hampshire, or any other Northern State which has vari-

able terrain and several months of severe winter weather. All troops stationed in the United States, excluding the states of Alaska and Hawaii, could be rotated for duty to this training center. If that training is rough, realistic, and the personnel well-motivated, they would emerge from this phase as capable winter soldiers.

2. Until this permanent type of training center could be established, an alternate means would be the annual larger-scale winter exercise in a Northern State. Primary expense would be the travel to and from the maneuver area. However, this would be only a fraction of the cost of the Alaskan journey. No special maneuver headquarters or other special arrangements are necessary if the majority of leaders have received winter training. Observers also could be eliminated. All troops could live in Arctic tents and the *only* purpose of the exercise would be to train the troops. The training aids necessary are plenty of snow and extreme cold. They are available in the North without cost. In the South one cannot purchase them at any price.

3. National Guard and Reserve units of the Northern States should receive winter clothing and equipment to enable them to train their troops at least in the fundamentals of winter warfare. It is not necessary that their equipment be new. The purpose would be to give some winter training *now*, not when the war has started. It is too late then. These northern guardsmen and reservists are, in general, better motivated for winter training than the soldiers from the South. Therefore, they would make high quality units if given the opportunity.

Dug-in tent with firing positions in snow

Two important objections to these recommendations have to do with money and time. The question of money has already been discussed briefly. The time element is concerned with the problem of need to know and nice to know. If the recommended winter training center could be established, most of the required Army Training Program subjects could be con-

ducted concurrently with winter training. This, of course, would require flexibility, commonsense, and the approval of higher commanders.

Cross-country oversnow mobility has been one of the greatest problems in winter exercises. Our troops still are roadbound to a certain degree; they still are too dependent upon roads and the bulldozed routes, and immediate support of their service units. Maneuver reports have emphasized that mobility will not improve by adding more bulldozers to the organization. Mobility depends *on training* of the units. We must learn the lesson that roadbound troops often are at the mercy of the enemy and may be defeated easily by numerically inferior forces. Only well-trained troops enjoy the freedom of maneuver. Superiority in cross-country mobility gives a great advantage to any force under winter conditions. Snow cover increases the capabilities of the movement of well-trained units but reduces the mobility of poorly trained troops. During Exercise *Caribou Creek* in 1959 a test was conducted between three march columns in similar terrain: The first unit consisting of ski column and light oversnow vehicles; the second unit riding in *M59's*; and the third riding in *M41* tanks. The first unit was "the overwhelming winner" and tank column the last one.

Use of Aircraft

Aerial movement of troops and supplies will be used to a maximum extent in northern operations. However, complete reliance on air mobility might lead either to a complete failure or to great difficulties. During winter exercises all aircraft have been grounded for days due to snowstorms. In the Battle of the Bulge in 1944 air support was not available for two weeks. There must always be alternate means for air mobility in winter operations.

While blizzards will make aircraft ineffective, they may greatly facilitate tactical ground operations. Experienced leaders utilize snowstorms and other periods of reduced visibility to surprise the enemy.

Deception

There has been a misconception among many leaders during winter exercises that nothing could be done in wintertime to deceive the enemy and to avoid the enemy from observing our movements. Consequently, no deceptive actions have been practiced in most winter maneuvers. This is a negative approach and should be dispelled. It is true that snow makes concealment difficult—not impossible—but it greatly facilitates deception. Experience in the winter war has shown that the enemy has bombed and shelled deceptive areas for days while the actual operations were being planned and conducted miles away from that area. One or two oversnow vehicles and a squad of men can prepare trails and tracks leading "nowhere" to mislead the enemy as to direction, location, and intentions. Hasty field fortifications are built into snow within a few minutes. Dummies may be built from snow blocks and artillery positions portrayed by using logs. Dummy jumps could be executed into snow and landing strips similarly "constructed." Pitching a few deceptive tents and maintaining some camp fires could easily cause the enemy to focus his attention to a desired location.

These actions compensate for the lack of camouflage. However, camouflage must not be neglected. Our soldiers seem to be indifferent to camouflage and many leaders lack basic camouflage discipline. Bivouac areas, logistical installations, and command posts often are bulldozed just off the road. Dozers have been used to open "streets" thus destroying natural camouflage. Ingenuity and improvisation are needed to use available material to camouflage tentage, vehicles, and all installations. Trails and roads must be kept to a minimum. Deception, camouflage, cover, and concealment should not be violated for convenience sake during peacetime train-

ing. If these techniques and tactics are not learned in training, they then must be learned "the hard way" in war.

Security measures during the advance, in contact, and when bivouacking differ from those used in snowless terrain. The trailbreaking party may perform the mission of an advanced guard. However, it often is necessary to have an additional security force because trailbreakers are too far ahead. Army aircraft, weather allowing, can provide additional security. However, use of aircraft for this purpose often has disclosed the avenue of approach to the enemy and surprise has been lost.

Inexperienced leaders in winter exercises have required that troops provide continuous flank security during the marches. This is neither practical nor feasible. Small patrols are unable to break their trail and keep up with the main body which is using a trail opened by the trailbreaking unit. Instead, small patrols from the advance guard should be sent to the key points on the flanks of the march route. These patrols then join the rear of the main body.

Ski Patrols

Defensive positions and bivouac areas require perimeter ski trails patrolled by "shuttle" patrols. Good trail discipline, better "noise" discipline, and crossing of perimeter trails by outgoing patrols only in designated places provides more effective security than in summertime, because enemy guerrillas or reconnaissance patrols reveal their intentions by trails in snow. These perimeter trails must be far enough from troop positions to allow time for alert. This important requirement has been violated in all winter exercises either because of lethargy or overestimation of distances.

Machiavelli said: "Nothing is easier to effect than what the enemy thinks you will never attempt to do." A well-trained unit in winter war can accomplish deeds which no text or tactical planner ever dreamed about. To be able to surprise the enemy often may require *wide*, well-planned, and time-consuming envelopments. However, they may be worthy of effort.

Weapons Employment

Experience in war has shown that it is more desirable to have a plentiful supply of ammunition for a few weapons than to have a number of weapons without ammunition. Often the heavier weapons must be left behind in cross-country operations because wheeled vehicles are roadbound and ammunition is too heavy to allow continuous resupply. Sometimes even part of the lighter crew served weapons are left with unit trains in the initial phase. The determining factor is: *How many weapons can be supplied with sufficient ammunition*? This factor has been misunderstood in winter exercises. It has been stated that we have to utilize all our firepower. Indeed we should, but, for an example, if we haul all the mortars with us, and circumstances allow resupply of ammunition only for one-third of the mortars, what is the value of the remaining two-thirds of the weapons? Attempts have been made to add realism to problems by issuing a simulated basic load of ammunition consisting of sand boxes. In most cases the sand was thrown away and the empty boxes placed in the vehicles.

Winter operations are dependent not only upon sufficient resupply ammunition but also on all other logistical support; therefore, logistical installations may become the primary targets for nuclear weapons. It is obvious that the tactical units using dispersed formations have good opportunities for passive defense in the northern wilderness. Our troops, again depending on the state of training, could concentrate rapidly for exploitation of a nuclear attack and then disperse and disappear into the wilderness. It is obvious that the mobile units in snow and cold have good capabilities of defending themselves against enemy nuclear weapons. The se-

vere winter climate presents problems in *employment* of nuclear weapons and maintenance of weapons and delivery means. In many respects these problems are different from those encountered in temperate zones and should be learned in winter exercises. Consequently, necessary data for winter conditions should be made available to the leaders of these exercises.

Other Aspects

Effects of snow, ice, and cold make the appreciation of these conditions so much different from a snowless terrain that inexperienced leaders often are unable to use the advantages offered by these circumstances.

1. Rivers, swamps, and lakes freeze forming good avenues of approach which can be utilized during long nights. Northern night is seldom dark; it rather resembles continuous twilight.

2. Thousands of lakes and rivers in the Far North are ideal landing places for both fixed-winged and rotary-winged aircraft.

3. Endless forests offer cover and concealment. These woods form a wilderness of hundreds of miles wide. They may easily conceal large bodies of troops which are preparing for operations. However, fighting in the woods needs more emphasis. We often have treated the training for forest fighting as a stepchild.

4. Sudden changes in weather offer to a leader with initiative many opportunities to surprise the enemy.

Summary

United States Army troops may be employed in the northern latitudes under any type of climatic or terrain conditions. We cannot afford to be unprepared for winter warfare. The problems have been "recognized," but response often has been apathetic.

The key to the success is leadership. We need enlightened, trained, and skilled leaders who will produce trained soldiers and trained units. Only by qualifying the leaders at all levels will lessons learned be used; only then will training become realistic, challenging, and appealing.

To obtain qualitative quantity of manpower capable of living, moving, and fighting in extreme cold and snow, some Army posts or perhaps a training center should be located in the Northern States. If we do not conduct winter warfare training on a larger scale, we shall lag behind in this field. A soldier who has endurance, stamina, and skill to move in snow and cold, who fires his weapon accurately, and who finds his way in the northern wilderness possesses the basic qualifications for a first-class winter soldier. Competent leaders have then a relatively easy task in building good units on this foundation.

Finally, the enemy has the same difficulties and problems to overcome as we have. We should take advantage of the cold and snow, and refuse to let the circumstances hinder us.

Let us not dread winter as an enemy but welcome it as an ally.

MOVING?

If you are moving, please notify the MILITARY REVIEW, Fort Leavenworth, Kansas, of your change of address. Be sure to include your name, *old* address, and *new* address.

The Nerve Centers of Command

Major Edwin J. McCarren, *Armor*
Faculty, U. S. Army Command and General Staff College

ADVANCES in nuclear weapons, missiles, mobility, combat surveillance, and electronic warfare have significantly increased the tempo and complexity of tactical operations. To provide the direction and information required by subordinates, command and staff action must keep pace with operations. Requirements of subordinate commanders and changes in the tactical situation must be acted upon quickly; rapid, well-coordinated decisions must be made and transmitted. What follows is a brief discussion of staff facilities which have been developed to assist the commander in the control and coordination of tactical and tactical support activities, and some concepts for further improvements.

The requirement for rapid coordination and prompt decisions in the conduct of tactical and tactical support activities has long been recognized. During World War II commanders improvised methods to pool the personnel involved in bringing combat power, particularly fires, to bear rapidly on a given point or target. An example of such an improvisation was the use of a G2-G3 operations section, with an artillery representative and air and naval liaison officers. The first formal facility established to fill this requirement was the fire support coordination center (FSCC) for division and corps. This was under the direction of the artillery officer and under the general staff supervision of G3. The FSCC was designed solely for coordinating fire support. Initially it consisted of the artillery fire direction center (FDC) and liaison sections from supporting fire support agencies, and was located at the artillery headquarters.

It was soon recognized that closely allied functions—such as maintenance of target intelligence, target analysis, and the planning and coordination of tactical air reconnaissance — should be performed in the FSCC. These functions were assigned and the location of the FSCC was moved to the corps or division command post. Although the FSCC has been used with considerable success, it only partially fulfills the requirement for a facility in which tactical and tactical support operations are controlled and coordinated.

At division *three facilities are involved* —G2-G3 operations, FSCC, and the radiological center (RADC). G2-G3 operations exercises over-all control and coordination of tactical and tactical support operations. Specialist advice is provided by special staff officers as required. The FSCC coordinates fire support (including air) and prepares target analyses to include fallout predictions for friendly employed nuclear weapons. The RADC maintains radioactive contamination data and prepares fallout predictions for enemy employed nuclear weapons.

The first formalization of an agency to control and coordinate tactical support activities other than fires was the development of the tactical support center (TSC),

The increased tempo and complexity of tactical operations in modern warfare require improved facilities to assist commanders in control and coordination of tactical and tactical support operations

shown in Figure 1, for use at field army and independent corps. The director of the TSC was the artillery officer. As director, he was responsible to the commander for the detailed control and coordination of fire support, tactical air support, Army aviation, electronic warfare, and air defense means available to the command. The TSC was tested in Exercise *King Cole* in 1957 and the following major deficiencies were noted by the testing headquarters:

1. The director was assigned duties not directly related to and often in conflict with his primary duty as artillery officer.

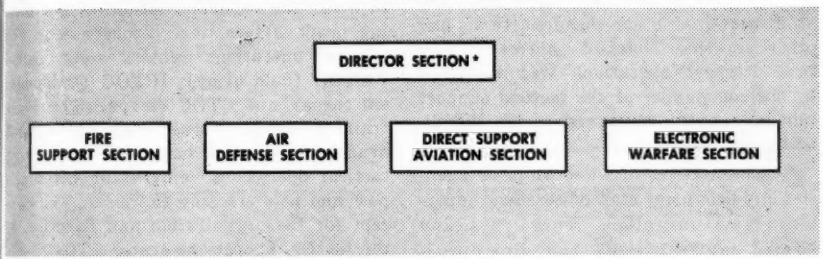
2. Use of the tactical support center tended to divide operations into two parts: maneuver, handled by the G3; and tactical support, handled by the tactical support center.

3. Command and staff actions in both planning and operations were complicated and slowed by integrating the director of the TSC into the normal command-staff chain.

To correct the deficiencies noted in the field test of the TSC, the army operations center (TAOC) was developed for use at field army and independent corps. It was directed by the G3. The general functions of TAOC were:

- Effect such control over the tactical means available to the command as is appropriate and within the authority delegated to the G3 by the commander.
- Coordinate and integrate tactical and tactical support operations.
- Coordinate and integrate tactical support rendered by other services with field army tactical and tactical support operations.
- Coordinate and regulate the use of the airspace over the combat zone.
- Coordinate and regulate those portions of the electromagnetic spectrum affecting field army operations.
- Maintain and display current data on the air and ground situation so that prompt action can be taken on changes in the tactical situation.
- Effect the required coordination and integration of the operational activities of G2, G3, artillery, Army aviation, elec-

ORGANIZATION OF THE TACTICAL SUPPORT CENTER (TSC)



* REPLACED BY G2-G3 SECTION IN THE ARMY OPERATIONS CENTER (TAOC) LATER DEVELOPED.

FIGURE 1.

Major Edwin J. McCarren served in the European theater with the 143d Infantry Regiment, 36th Infantry Division, in World War II. He was assigned to General Headquarters, Far East Command, during 1948-51; was assistant S3, 3d Armored Cavalry Regiment, 1952-53; was with Headquarters, United States Forces Austria, 1953-55; and served as Assistant US Army Attaché in Vienna in 1955-56. He was assigned to the faculty upon completion of the Regular Course of the U. S. Army Command and General Staff College in 1957.

tronic warfare, air defense, and others as required.

The army operations center was not an echelon of the field army headquarters, but was an integrated facility of the staff in which current tactical and tactical support operations requiring expedited handling were controlled, coordinated, and integrated. It had no organic units or surveillance equipment, and was dependent for information upon operational agencies, staff sections, other headquarters, and other services. Detailed control of tactical support operations was exercised by the commander of the tactical support unit or agency concerned under the direction of TAOC.

Representatives of these units or agencies and field army staff officers who supervise these operations were physically located in TAOC and had direct communications with the operational agency concerned. Additionally, to facilitate coordination, liaison officers from other services and from other commands were located in TAOC or in the immediate vicinity.

The major difference between TAOC and the TSC was the replacement of the director section by the G2-G3 section. This change resulted in maintaining the normal command and staff relationship with TAOC controlling and coordinating all current tactical as well as tactical support operations.

In 1958 TAOC was tested by the XVIII Airborne Corps in Exercise *Cumberland Hills* and by the 7th US Army in Exercise *Lion Bleu*. The effectiveness of TAOC was readily acclaimed by both headquarters and the following general recommendations were made to Headquarters United States Continental Army Command.

1. Army aviation and tactical air support activities should not be handled by the same section.

2. A chemical, biological, radiological section and an engineer section should be added.

After evaluation of the comments from the testing headquarters, Headquarters USCONARC accepted the validity of TAOC for field army and independent corps and further recognized the validity of a similar type facility for the tactical corps.

A draft training circular was prepared in which the recommendations of the testing headquarters were incorporated. The tactical operations centers were called FATOC (field army), ICTOC (independent corps), and CTOC (corps). The draft training circular was used by several headquarters as a basis for organizing tactical operations centers for command post and field training exercises. The concept for the organization and function of the tactical operations center (TOC) was approved by the Department of the Army and a new training circular entitled *Tactical Operations Centers* is now ready for publication.

The TOC described in the new training circular operates under the over-all direction of the chief of staff and under the general staff supervision of the G3. The operational elements of the G2 and G3 staff sections constitute the nucleus of the TOC. The operations elements (or portions thereof) of other general and special staff sections are included in the TOC as the commander considers necessary to ensure expedited staff actions, command decisions, and implementation of the decisions. The senior officer in each TOC element assists the commander in directing, controlling, and coordinating those tactical or tactical support operations which are the responsibility of the general or special staff officer he represents. The G1 and G4 maintain minimal representation in the TOC, usually in the G2-G3 operations. The size and composition of the elements may vary with operational requirements and the desires of the

commander. A typical TOC as shown in Figure 2 consists of:

- G2-G3 operations, composed of a G2 element and a G3 element and a data processing group.
- Army aviation element.
- Air defense element.
- Fire support element.
- Tactical air support element, composed of a G2 air group and a G3 air group.
- Communications-electronic element.
- Chemical, biological, radiological element.
- Engineer element.
- G1 and G4 representation.

The staff representation in the TOC assists the commander in:

1. Direction, control, and coordination of current tactical and tactical support operations of his organic, assigned, or attached forces. This includes the use of the airspace by the commander's organic, assigned, or attached Army surface-to-surface fire support means, Army surface-to-air fire support means, and Army aviation units. This general function also includes the use by his organic, assigned, or attached Army forces of that portion of the electromagnetic spectrum allocated to the commander. This function is to be exercised within the authority, policies, and procedures prescribed by the unified commander or agreed to by the service component commanders or by the service element commanders concerned.

2. Integration of that support provided to him by other Army elements and by elements of the other services with the tactical and tactical support operations of his organic forces. This integration is accomplished by specifying to the rep-

ORGANIZATION OF TYPICAL TACTICAL OPERATIONS CENTER (TOC)

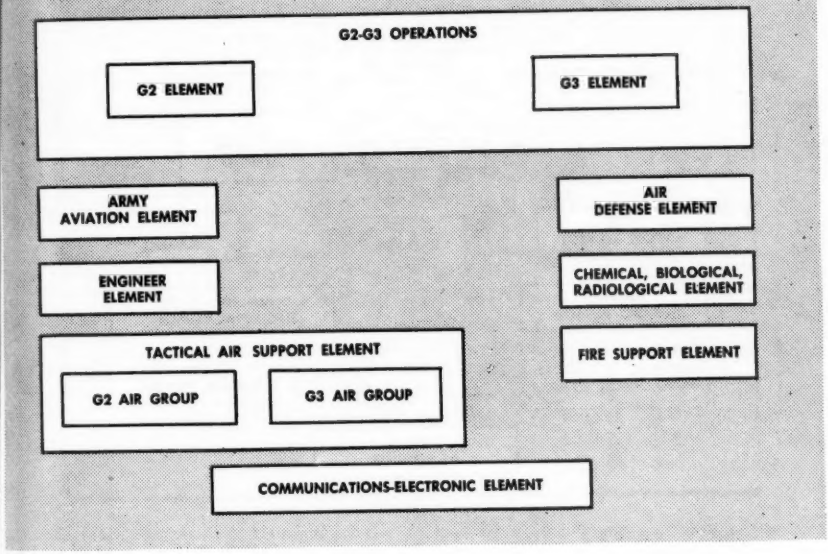


FIGURE 2.

resentatives of the supporting commander such items as the type of support required, targets, time on targets, results desired, and troop safety considerations, if appropriate.

3. Coordination with other services. This includes such items as the coordination of the use of the airspace over the field army or independent corps commander's area of responsibility. This function is to be exercised to the extent authorized or directed by the unified commander or agreed to by the service component commanders or the service element commanders concerned.

Concurrent with the preparation of the TOC training circular, continued consideration is being given to extending the concept to provide for tactical operations centers in infantry, armored, and airborne divisions.

Further improvements in the TOC will result from improvements in staff organization and procedure. One such concept includes a TOC as shown in Figure 3 for field army, corps, or division which is headed by a director for tactical operations (DTO) who is the principal staff officer for *all* operative activities. Since the army operations center and tactical operations center are headed by the G3, one general staff officer (G3) attains the power of decision over matters affecting another general staff officer (G2). The provision of a director for tactical operations, as the common superior of the G2 and G3, should result in more effective operations within the TOC and in all operative staff functions.

CONCEPT FOR TACTICAL OPERATIONS CENTER (TOC) ORGANIZATION

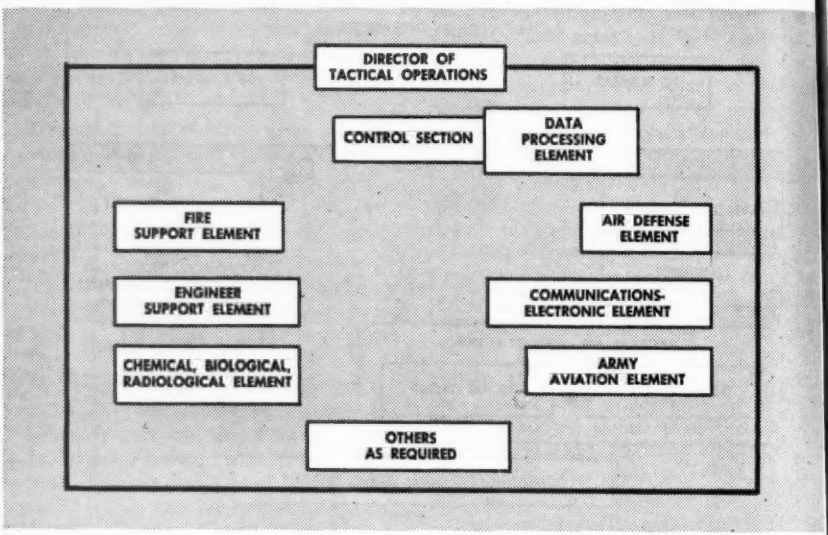


FIGURE 3.

The major differences of the TOC depicted in Figure 3 from the present one shown in Figure 2 are:

1. The TOC is directed by the DTO.
2. Planning and coordinating the use

of airspace is accomplished by the G3 element of the TOC control section instead of the air defense element. This is considered more appropriately a G3 function than an air defense element function because of the effect which changes in the airspace utilization plan have on other tactical and tactical support activities.

3. The tactical air support element is eliminated and the function of coordinating air-to-surface fire support is performed by the fire support element (FSE). Tactical air reconnaissance is handled by the G2 element in the TOC control section. Under the earlier concept the G2 air and G3 air elements constituted the tactical air support element (TASE). This, in effect, fragmented the G2-G3 operations section and split responsibility for the coordination of fire support between the FSE which handled surface-to-surface fire support (and retained responsibility for preparing the fire support plan) and TASE which handled tactical air support.

Another concept for the control and coordination of tactical and tactical support activities which uses the current staff organization is the command operations center (COC), visualized in Figure 4. The COC is directed by the deputy chief of staff for operations thus retaining the advantage of a common superior for the G2 and G3. The COC differs from the other operations centers discussed in that the center can be envisioned as an operations center within an operations center, a "nerve center" where *representatives* of the G2 and G3 staff sections and COC sections concerned with tactical support meet under the direction of the deputy chief of staff. These representatives are authorized by their respective staff section or COC section chief to make decisions or recommendations on current operations. Direct communications from each representative to his respective staff section or COC section are provided for the representative to keep abreast of the situation in his parent section, to obtain specific information required for decisions, and to provide the staff or COC section with decisions or instructions.

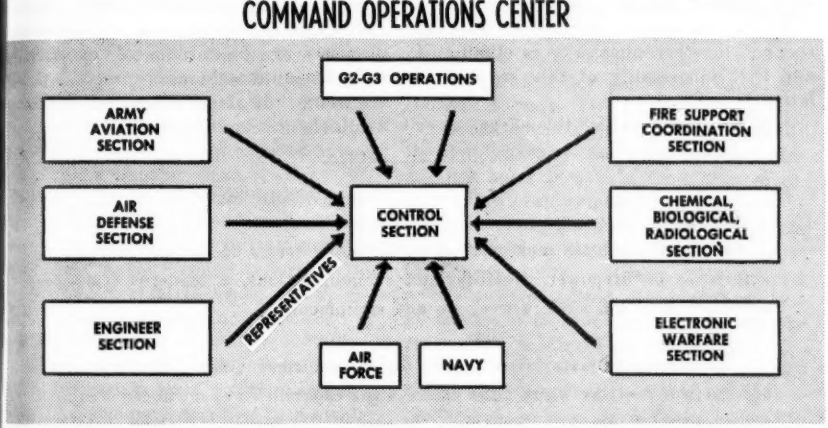


FIGURE 4.

Some advantages of the COC concept are:

1. Representatives empowered to act

for their respective section chiefs are physically grouped in one room or tent with the director of the COC who, within delegated authority, makes decisions.

2. Decisions are made with minimum delay since all interested agencies are represented and common use is made of information display equipment, thus drastically reducing coordination time. Conflicts which cannot be resolved by the representatives through coordination are quickly identified and an authoritative individual (deputy chief of staff) is physically present to make decisions.

3. The requirement for locating all COC sections together physically is eliminated and the vulnerability of this key installation is reduced.

4. Equipment by which this nerve center can be identified by enemy target acquisition means is minimized.

The requirement for decreasing staff and command action time or staff inertia has been recognized. There has been an evolution of agencies designed to assist the commander in the control and coordination of tactical and tactical support operations. The basis for each of these centers has been the physical grouping under an authoritative head of those individuals who can quickly coordinate and act upon current operational problems requiring expedited staff and command action. Further improvement in the concept discussed can be anticipated, particularly as more automatic data processing and electronic display equipment becomes available.

In order to obtain maximum effectiveness in terms of the essential characteristics of firepower, mobility, and communications, a modern Army requires, first of all, modern weapons and equipment.

* * * * * * *

After modern materiel, a second major requirement for a modern Army is a tactical doctrine which fully exploits the capabilities of advanced weapons and equipment. Because technology is continually increasing these capabilities, doctrine must be constantly reexamined and revised as necessary. Exploitation of new resources brings increased effectiveness, but often raises new questions as well. The need to find answers emphasizes the importance of imagination, openmindedness, and originality, as well as thorough technical knowledge. . . .

Closely allied is the requirement for organization so designed as to make the employment of our modern tactical doctrine feasible.

Beyond the need for realistically modern tactical organization, there is a need for realistically modern organizational concepts for the over-all employment of military forces, of which Army forces are an integral part.

General Lyman L. Lemnitzer

Strategy of Protracted Defense

Slavko N. Bjelajac

A DEFENSE along the borders of European nations proved ineffective in World War II. Superior in strength, the aggressor smashed this type of defense in one situation after another. Armor and motorized forces drove wedges deep into the defender's front, penetrated into rear areas of field armies and into the interior of the countries cutting units and sectors of the front into ribbons. Encirclement of forces so divided ended in surrender of entire units. The personnel of these units threw down their weapons, often without having a real chance of using them.

Poland, France, Belgium, the Netherlands, Denmark, Norway, Yugoslavia, and Greece were smashed in this manner, faster than anyone could believe. I observed at first hand the conquest by the Hitler armies of one European country after another.

I witnessed the incredibly swift fall of Yugoslavia, her defense positions cut into pieces. The command posts of field armies and divisions were disorganized or destroyed outright before the troops had a chance to enter the fight. Divisions and regiments had no chance of reestablishing their defenses; the enemy advanced much faster than the defense could withdraw or repair the breaks. An army, which from 1912 to 1918 opposed successfully superior German, Austrian, Hungarian, and Bulgarian Armies, surrendered this time in a matter of two to three weeks. It was a surprise which should not have been.

It would be wrong to believe that the debacle of Yugoslavia and other European countries came so fast only because of German superiority in armor and air, and because of their air and land mobility. The term enemy superiority often is used as an excuse for omissions and mistakes in an attempt to justify defeat. Both the new offensive strategy used by the German forces and the obsolete type of defense used by the defender should be credited for German success.

The concept of blitzkrieg became a reality mainly because the defending countries did not know how to defend themselves. Some European armies had no chance to use their weapons or expend their basic loads of ammunition. In many instances, artillery, including antitank artillery, was never once committed. Some soldiers had no chance to be faced with or even to see the enemy soldier until their unit surrendered and the Germans came to pick them up as prisoners. A tremendous amount of ammunition and war materials was seized in stores. The concept of war and the strategy of the defense of these countries proved to be catastrophic.

Lessons of World War II

The situation confronting the allied European countries is much different since the North Atlantic Treaty Organization countries have integrated their individual defenses into a common defensive organization. Weaknesses which are inherent to an exposed and small country have been eliminated. However, that is not the

The strategy of the protracted defense is a powerful deterrent to aggression. It should be planned and prepared as an eventuality by weak and exposed countries as a future means of resisting an enemy

case of allied countries throughout Asia. These still have their weaknesses, multiple indeed, which the European allied countries once possessed. Therefore, it is believed that an examination of deficiencies in the concept of war of European nations prior to World War II may offer a lesson to the allied countries in the Middle and Far East.

The following principal deficiencies in the concept of defensive war are to be blamed for unexpectedly fast and early defeats of the European nations.

First, main lines of defense along national borders, with no capability of withdrawing forces for orderly defense of the interior of the country, resulted in a zero capability for prolonged resistance subsequent to formal military defeat.

As we know, an orderly withdrawal requires forces, weapons, and equipment capable of resisting the enemy, and a command apparatus capable of conducting a most delicate, complicated, and difficult military operation. High morale, self-confidence, and psychological preparation of the troop units and of the local population to accept a forced loss in territory are the most important requirements for effective resistance following initial defeat. Without psychological preparation even a loss of frontier provinces may be detriment for the final issue of the war.

Depth of the battlefield will be neede in any future war. This is particular true in the case of weak armies, becau the enemy superiority at the outset wi require mobile defense in depth. A stron army—well-trained, well-equipped, an well-supported by air—is required to ex cute a successful withdrawal before a su perior enemy force. A probable use by th enemy of vertical envelopment with a mobile battle groups and use of nuclea weapons will complicate the defensiv strategy more than ever in the past. It i conceivable that a successful withdraw may become almost impossible in the fu ture.

Few exposed and economically wea countries in Asia possess the material re sources, manpower, training, and skill re quired to provide effective resistance alon their national borders. Loss of frontie provinces or even of the greater part o the country to the enemy may be inevitabl in the beginning of war and, therefore must be included as a possibility or prob ability in the defensive plans and prepa rations.

Second, there was no established concep for a continued war against the invade through prolonged resistance by the rem nants of the conventional forces. Once th main lines of defense were smashed, re sistance to the enemy ceased. Troops wer neither indoctrinated nor told to disper to avoid capture and to continue to figh by regiments, battalions, companies, pla toons, and whatever remained. Instead o striking against the rear of the aggresso —against his lines of communications, re serves, and supply columns—troops sur rendered, although they had an abundan quantity of arms and ammunition at their disposal. There was no planned concept fo utilization of military manpower after th conventional defenses failed. Troop units believed that since the command posts o their field armies and divisions were over-

---

Slavko N. Bjelajac is a consultant on Unconventional and Psychological Warfare with the Special Warfare Division, Office of the Deputy Chief of Staff for Military Operations, Department of the Army. Formerly a colonel on the General Staff of the Royal Yugoslav Army, he is a graduate of the Yugoslav Military Academy, the Ecole Supérieure de Guerre, *and the General Staff College. He commanded a force of 9,000 Nationalist guerrillas and an underground of 5,000 after the collapse of Yugoslav formal resistance. Later he was Under Secretary in the Ministry of War at Royal Yugoslav Headquarters in Cairo. Since 1949 he has been employed by US agencies, and was on the faculty of Georgetown University for four years. He is the author of "Soviet Unconventional Warfare Capabilities," which appeared in the November 1959 issue of the* MILITARY REVIEW.

un, it was normal for them to surrender nd become prisoners—an act of which ey were not ashamed since they were eaten in combat."

Third, the concept of utilization of mil- ary manpower was one-sided and in- dequate. It was planned for conventional ombat only. Although manpower remained bundant after the collapse of conventional efenses, it was abandoned to the enemy. f post-defeat resistance had been planned, umerous dispersed battlefields could have een organized over all these countries by he utilization of this costly and well- rained manpower.

Unconventional warfare as a continua- ion of conventional war was, unfortu- nately, not considered by these govern- ments, and herein lay another error of heir policy and concept for defense.

The example of General Mikhailovitch of Yugoslavia, who continued the war by he use of guerrilla tactics, was unique nd isolated. His action was not a part of he government's planning; he improvised. A planned and prepared resistance pro- gram never would have ended in the Com- munists taking power either in Yugoslavia or in some other countries. Communist par- ties would not be able to use occupations nd disorganizations of authority for Bol- shevization in these countries. However, he Communists fish well in muddy waters.

Fourth, there existed no common con- cept of the continuation of resistance by an overrun country in order to assist the adjacent country when attacked. Although the countries were sincere allies, their planning was for themselves alone—*cha- cun pour soi*. Lack of concept of a pro- longed resistance after conventional fronts collapsed resulted in destruction of one country after the other. Such resistance, if planned and applied, would buy the time and space for the adjacent allied country.

It is evident that many nations did not know how to defend themselves and that their concept of defense in World War II was a failure. Nothing has happened since that would indicate that such a concept may be feasible in the future for any coun- try. On the contrary, inherent defensive weaknesses, new and modern weapons— including nuclear weapons—great land and air mobility, and the probability of the aggressor having the initiative makes that concept of defense even more un- thinkable. Such a concept of defense would be catastrophic for allied countries in Asia, particularly for those which are geograph- ically exposed to aggression and cannot maintain forces strong enough to oppose a superior aggressor by themselves.

Defense Problems

The USSR and China, if aggressors, can always establish the required superi- ority to smash the defense of these coun- tries easily and quickly no matter the num- ber of divisions with which the defender may oppose them. Therefore, if these coun- tries have more divisions in the future than they have today, assistance will not be in- creased materially if divisions are going to be deployed only along conventional lines.

The cost of maintaining a number of modern conventional divisions may pre- sent a serious financial problem for an economically weak country. Support of such divisions may mean not only a great economic burden but eventual bankruptcy. For some countries it may not be the prob- lem of money alone, but of the command cadre which may be difficult to find, edu- cate, train, and maintain on the level re- quired by the standards of a modern army. Able command cadre and modern equip- ment which can match the enemy, efficient maintenance, and many other requirements of modern war may overburden the eco- nomic structure of the weaker nations. A balanced force composed of divisions and of independent battle groups and combat teams may be the answer to the real re- quirement of some of these countries.

For other countries even divisions may prove to be too large. The same manpower,

if organized into lighter independent battle groups and combat teams, may do a much better job for a longer period of time particularly in mountainous countries. Such organization would require less financial effort and much less equipment. Whatever may be the case in a particular country—a balanced force consisting of divisions, independent battle groups, and combat teams or a force consisting of independent battle groups and combat teams only—both must be capable of a protracted defense against an enemy much superior in strength.

Elements of a Defense

A protracted defense by an exposed country against a much superior enemy should rest on three clearly distinguished elements:

The first element would be a conventional defensive zone with field armies, divisions, or independent battle groups for defense in depth of the most favorable terrain features. Possibly the most vital parts of a country should be defended. If the strongest positions are found in the heartland, they may be defended instead of splitting forces on several separate defensive positions. Defense must be prepared against vertical envelopment no matter where the conventional defenses are established—in border zones, in the heartland, or elsewhere.

The second part would consist of battle groups or combat teams which occupy and defend positions far ahead of conventional defenses. These may be placed in the border areas with the role of retardation. These units will withdraw to predesignated positions or stay and fight on initial positions. If overrun, no matter where they may be, the units will split into smaller groups to avoid annihilation and then attack enemy rear elements harassing supply trains and lines of communications and tying down his forces.

In case of withdrawal of the first element of defense, additional battle groups or combat teams may be left as stay-behinds with the same or similar purpose as battle groups and combat teams placed in border areas. Depending on the capability of the enemy, each battle group or combat team sooner or later will split into guerrilla type units, and will carry out operations by the use of guerrilla tactics. Each guerrilla unit or group of units will be given an area of responsibility and a long-lasting mission in order to avoid the necessity of an elaborate communication net. The areas of operations would coincide with the system of enemy lines of communications, which should be the primary target areas to be covered.

The third element would be guerrilla type forces composed of specially trained regulars, indigenous population, and other unconventional warfare type forces and supporting organizations. These would be placed in the spaces extending from conventional defenses to the groups or teams in border zones and even farther into enemy territory to carry out harassments in depth. The guerrilla forces would be placed also in the rear of conventional defense positions and on the flanks, eventually covering the entire country.

Manpower and Materiel

Among the principal requirements of the protracted resistance type defense is manpower and light weapons and equipment. Loss of personnel, light weapons and equipment to the enemy must be reduced to a minimum. Consequently, battle groups or combat teams will resist aggressor in a mobile defense, and will split into smaller groups or guerrilla units before losing the bulk of their manpower.

When the main defensive zone is overrun and resistance on it becomes impossible, the conventional forces would split into smaller groups and continue operations against the enemy by attacking him where he is found. In order to avoid annihilation these groups may split further. Light guerrilla groups and units will b

e last splitting phase. It should be noted, owever, that conventional units, once erun, may under favorable conditions reserve their structure for a period of me and fight as units. In principle, the litting into smaller and reverting into rger units and groups may be a contin- ous process depending on necessity and asibility. The largest possible degree of xibility is recommended to suit changing tuations.

The protracted defense is waged as a ontinuation of conventional resistance un- l the end of the war. In addition to the ilitary manpower which is preserved fter conventional units have been over- owered, the civilian population is re- ruited. Those not recruited into military nits will provide food, transportation, and ther support while working on their nor- al jobs. Undergrounds and other covert upporting organizations are fully utilized.

Another principal requirement of pro- racted resistance now may be an adequate utside system of resupply of expendable tems which cannot be found within the ountry itself.

Tie-Down Capability

If such a protracted resistance is con- ducted, it is believed that even the weakest ountry may become capable of tying down much superior enemy forces and of inflict- ng greater losses than by employment of onventional combat only. The contribu- tion to the allied war effort by small coun- tries may be more effective and may last for the duration of war.

The lessons from World Wars I and II each that one guerrilla can tie down 10 o 15 conventional troops and, therefore, hat the enemy must have a force 15 to 20 times superior to fight guerrillas. If we assume that an allied country of Asia which has eight divisions is overrun but has succeeded in preserving manpower and light equipment, and that preserved man- power is utilized for a continuation of the war by application of guerrilla and uncon- ventional warfare tactics, that country will have the capability of tying down an enemy force equal to 80 divisions.

According to German statistics, 612,000 German troops were tied down in World War II in the Balkans by 25,000 to 45,000 guerrillas and their supporting under- grounds. It was a contribution greatly ap- preciated by the Allied Headquarters, for these German forces if used on the Rus- sian front possibly could have changed and certainly would have prolonged the war. In his book, *Closing the Ring*, Win- ston Churchill has stated that "Guerrilla forces in Yugoslavia and Albania are con- taining as many [German] divisions as are the British and American armies put together."

It is believed that the tie-down capabil- ity of small allied countries, if applied in a protracted defense, may in the future be the key to victory, particularly because of existing superiority of Sino-Soviet bloc countries in military and civilian man- power. Even if 50 percent of the manpower is lost—killed, missing, wounded, and those taken prisoner—in the above case the al- lied country, having now assumed man- power equal to four divisions, may retain a tie-down capability equal to 40 enemy divisions.

Geographical Factors

The feasibility of protracted resistance may be questioned in certain areas because of terrain and other conditions. It is often wrongly believed that only mountainous terrain is suitable for guerrilla type op- erations. On the contrary, it is the inter- mediate type of terrain which is much more suitable, and, as we know, guerrilla warfare is waged even in deserts. Opera- tion of other components of unconven- tional warfare—such as the underground, civilian support elements, and intelligence —is influenced little by terrain. Psycho- logical warfare and propaganda know of no terrain barriers.

Density of communications, of industrial areas, and of population settlements will

not hamper resistance. Where guerrilla units cannot operate because of security forces, the underground and other resistance organizations may be used with the same effect.

It is evident that a nation's resources —such as foodstuffs, transportation, and civilian manpower—may be better utilized in a planned than in an unplanned protracted defense. Denial of a nation's resources to the enemy is done on an organized and planned basis contrary to the situation where guerrilla bands and the underground emerge and operate on their own initiative without a well-established plan.

The command cadre and personnel for a protracted defense to be waged mainly with battle groups, combat teams, and guerrilla groups is easier to provide than the cadres required for modern large conventional units. The latter are becoming more and more complicated and require very capable personnel including scientists. It is expected that the indigenous personnel of even undeveloped countries can be trained relatively easily for this type warfare. Their nature and situation may well suit guerrilla type warfare and small unit operations.

Preparation

Strategy of protracted defense, as a future means of resisting aggressions by weak and exposed countries, should be planned and prepared as an eventuality. Conventional forces must be so trained and both the military and civilians of a country prepared psychologically. It must be understood that a loss of territory for conventional combat does not mean the loss of it for unconventional combat. Through the latter the territory (a part or an entire country) is dominated and parts may be completely controlled.

A type of special forces, similar to the US Special Forces, may be organized and trained by these countries to provide each with the capability for dealing with the specific problems of unconventional warfare. These forces may take over the most difficult operational areas of an overrun territory, serve as experts and advisors to guerrilla area commands and staffs in the others, and train troops and civilians in guerrilla tactics and types of unconventional warfare operations. At the same time, special forces will be best suited to be infiltrated into enemy territory in order to wage guerrilla warfare against the enemy on his own soil. Guenther Blumentritt, former German General, has stated:

It is my belief that in a future war the fight will be directed primarily against enemy activities in rear and that battle will be sought only as an auxiliary means to achieve victory. Only in that way will it be possible to end war quickly and minimize the mass losses to men and material. By the same token the cost of war can be reduced.

The degree of the application of strategy of protracted defense may vary from country to country depending on the geographic position, exposure to aggression, depth of national territory, terrain, nature of population, and on the expected US and allied support in case of aggression. The weaker the military position of a country the greater the application of protracted defense must be in order to save manpower and continue resistance.

The strategy of protracted defense as suggested here seems to offer a way by which a small and weak allied country can by itself, and left almost to itself (with the exception of supplies), contribute to the allied war effort throughout an entire war. At the same time, this strategy offers a possibility of dominating and eventually controlling its soil in spite of occupation by the enemy of parts or all of the country. This is not the case in the absence of a planned protracted defense. In the absence of this, the country and its people are at the complete mercy of the enemy. Furthermore, the application of this strategy may prevent seizure of power by the

Communists, for the Communist Parties will in the future, as they have in the past, try to utilize occupation for the Bolshevization of a country.

The strategy of protracted defense is by itself a powerful deterrent to aggression, for the enemy must count on a long period of resistance which would tie down his large conventional forces, and cost him lives, money, and materiel.

As to the problem of cold war and the internal security of an economically weak and exposed allied country, this type defense will suit best the needs for suppression of revolts and harassments by Communist inspired guerrillas and terrorists. Conventional and unconventional units with personnel trained in guerrilla warfare, utilization of civilian support, and use of the underground and other devices of unconventional warfare are the most suitable for suppression of these subversive activities. These forces will be a strong deterrent to revolts and terrorist actions by indigenous troublemakers and volunteers of the Chinese Communist type.

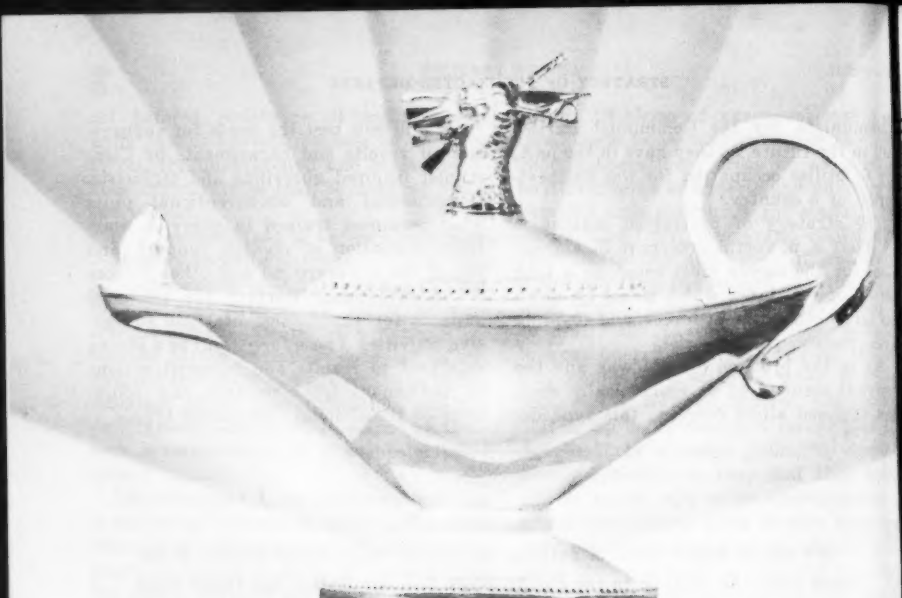
We can no longer think of national security in terms of the defense of our shores from the Atlantic to the Pacific. Since 1945 our Nation has found itself in circumstances completely new in its history. There is no need to recount the long series of Communist aggressions and threatened aggression. You know the story. You have lived through the years since World War II. My point is that, in the face of relentless and dynamic communism, our national security has become interdependent and interrelated with that of a worldwide community of free nations. We have made a significant transition from a historical attitude of 'security through isolation' to a policy of 'national security through *collective security.*'

* * * * * * *

Collective security has more than military significance; it embraces economic, political, and moral factors as well. The foundation of a viable system of collective security is the strengthening and welding together of the economic and military capabilities of the participating nations into a sound system of mutual defense against the common threat.

An extensive system of treaties provides the political basis for collective security in the Free World. Within the framework of these treaties, the United States has committed itself to military alliances with some 45 nations.

General George H. Decker



MILITARY AUTHOR HONORARIUMS AND AWARDS

- The MILITARY REVIEW announces an increase in the honorarium for published articles written by United States military personnel on active duty. These authors will receive a minimum honorarium of $50.00 for each published article of 2,500 words or greater length. Previously, a standard honorarium of $25.00 has been paid for articles.

- Up to $100.00 may now be paid for exceptional articles with respect to quality of writing, evidence of extensive research, quality of illustrative material, and subject analysis. Articles of less than 2,500 words will receive an appropriate honorarium.

- At the end of the award year (November-October) a faculty committee of the U. S. Army Command and General Staff College will select the best and second best article published during the award year. The first place article will be awarded $250.00 and the second place article $100.00. The monthly award system will be discontinued beginning with the July issue. First and second place annual awards will begin with the November 1960 issue.

- Other categories of authors are not eligible for the annual award. Rates of payment to these other authors are as determined by the Editor in Chief, MILITARY REVIEW.

MILITARY NOTES AROUND THE WORLD

UNITED STATES

'Mauler' Missile Development

A development contract for the *Mauler* missile system has been let by the United States Army. A compact, highly mobile weapon which will use solid propellant, radar-guided missiles, *Mauler* is designed to destroy short-range enemy ballistic missiles and rockets, and high-performance tactical aircraft. It will be employed as a forward area defense weapon. The development contract calls for the expenditure of five and one-half million dollars during the first year to develop a self-contained unit mounted in a single tracklaying vehicle of a standard design. It will be fully mobile and capable of delivering accurate fire even while moving.

Each unit will contain its own power supply, target detection, electronic fire control equipment, and a battery of missiles. The unit will be air transportable by fixed or rotary-wing aircraft and will be air droppable.

Mauler missiles will be shipped in lightweight containers which will also serve as launching tubes. One man will be able to operate the system, but each vehicle will carry a two-man crew—a driver-radioman, and an operator. A weapon's commander will be added when required.—News release.

More 'Mohawks'

A contract has been awarded by the Army for 42 *AO-1 Mohawk* aircraft (MR, Apr 1960, p 76) to be delivered starting February 1961. The *Mohawk*, now undergoing user tests, is designed as a short takeoff observation plane.—News item.

'Muscle' Engine

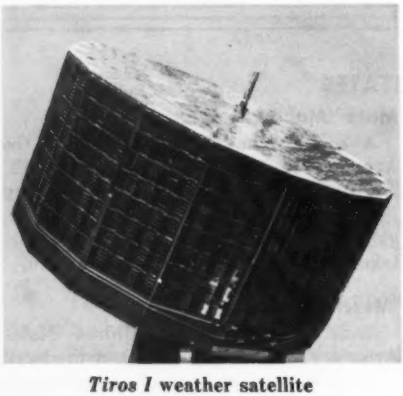
Basic research at the United States Army's Frankford Arsenal has produced a crude forerunner of what someday may be a "muscle" engine. The device consists of an organic film that contracts when it comes into contact with an acid, and expands when it comes into contact with an alkali.—News item.

Irradiated Food Research

The Army has announced a revised program to accelerate research on specific irradiated foods for military use. Plans call for construction of a research facility geared directly to the requirements of the new program at an undetermined location. Research effort will be directed primarily at total sterilization of pork, beef, and chicken for long-term storage. The program will be coordinated carefully with a related civilian program being developed by the Atomic Energy Commission.—News release.

'Tiros I' In Orbit

The instrument package contained in *Tiros I*, the National Aeronautics and Space Administration's recently launched weather satellite, was developed under the technical guidance of scientists of the United States Army Signal Corps' Research and Development Laboratory, Fort Monmouth, New Jersey. The top and sides of the satellite, which is shaped like a giant hatbox with 18 sides, are covered with a total of 9,200 solar cells. It contains two television cameras, each of which is no longer than an ordinary water glass. One camera is equipped with a wide-angle lens that can view an area 800 miles square. The other produces more precise pictures of an area 30 miles square.



Tiros I weather satellite

The *Tiros I* primarily is a research satellite designed to collect experience data to be used in the development of a series of operational weather satellites. However, it should produce considerable useful data on weather phenomena and should facilitate more accurate forecasting.—News item.

New Tear Gas Developed

Development of a new highly effective tear gas which causes no permanent injury has been announced by the Army. Tests have been conducted on volunteers of various ages and health to determine toxicity.

The gas causes severe burning and watering of the eyes, irritation of the respiratory passages, a burning sensation on moist areas of the skin, painful, forced coughing, and involuntary closing of the eyes.

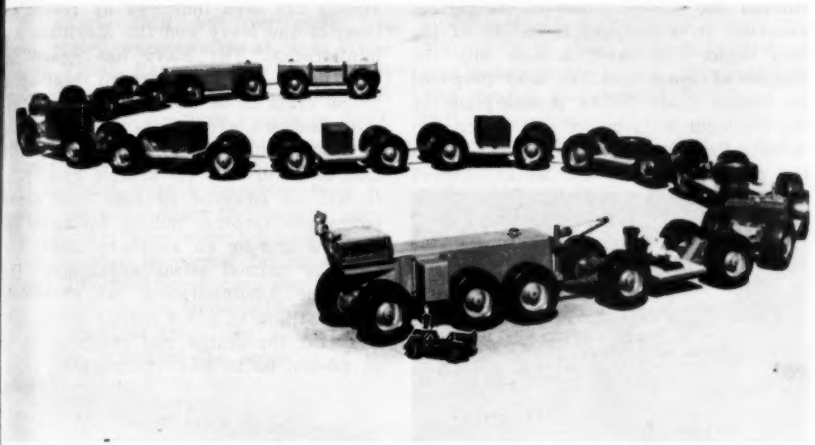
It can be used as a chemical warfare training aid since it has a quick, positive effect and can be used as a harmless simulant for war gases. Even in small concentrations, the gas causes extreme discomfort instantaneously to exposed personnel. The effects dissipate quickly in fresh air.

The gas can be delivered in a grenade that disperses it as a smoke cloud or in aerosol form, or it can be delivered by any of the devices used to spread conventional tear gas. It can be prepared in a gelatin capsule form for use as a training aid. Extensive testing by the Army with soldier volunteers has revealed no evidence of injury.—News release.

The Art Of War

Computations made on an electronic computer by a former president of the Norwegian Academy of Sciences, aided by historians from England, Egypt, Germany, and India, have produced some astounding figures on the frequency and severity of wars. Included in these findings is the fact that since 3,600 B. C. the world has known only 292 years of peace. During this period there have been 14,531 wars, large and small, in which 3,640,000,000 people were killed. The value of the destruction inflicted would pay for a golden belt around the earth 156 kilometers in width and 10 meters thick. Since 650 B. C. there have been 1,656 arms races, only 16 of which have not ended in war. The remainder have ended in economic collapse.—News item.

Largest Land Train



Scale model of overland train

An overland train is under construction for the United States Army which, as far as is known, will be the largest and most powerful rubber-tired vehicle in existence. The new train, which is similar to but much larger than *Sno-Trains* currently in use in the Arctic (MR, May 1960, p 68), will consist of a lead control car, 10 four-wheel cargo cars with a total capacity of 150 tons, and two power cars. Each wheel, measuring 10 feet high and four feet wide, will be driven by a high-torque electric motor geared directly to its rim. Current will be supplied to each motor through flexible electric cables which virtually eliminate the limitations associated with mechanical power trains.

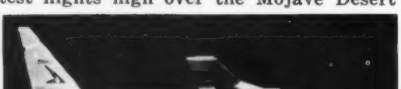
An auxiliary generator in the control car will provide sufficient power to move the control car and one cargo car when detached from the rest of the train. Steering is provided by a single fingertip switch which is flipped to the right or left according to the desired turning direction. Only the two front wheels of the control car are power steered. The remainder of the cars track automatically, controlled by a mechanical linkage.—News release.

More 'Nike' Duties For Guard

The Army National Guard will have 34 missile battalions in its troop structure by mid-1961. These battalions will comprise a total of 127 firing batteries, 82 of which will be fully operational and actively manning air defense installations in 16 metropolitan areas in the Continental United States and Hawaii. Forty-five batteries will be in an armory training status, but will be elements of battalions manning active missile sites and will train on the missile equipment of the active batteries. National Guard units now are operating 40 *Nike Ajax* batteries in 10 major population centers. The assumption of 36 additional battery sites by National Guard units during the next 16 months will release 8,000 Active Army missilemen for reassignment to other guided missile units.—News item.

'X-15' Tests Enter Second Phase

The *X-15* high-altitude rocket plane has entered the second phase of its testing program. It is designed to be one of the first vehicles to carry a man into the fringes of space and has been proposed for orbital space flights. A test pilot for the National Aeronautics and Space Administration recently flew the craft on test flights high over the Mojave Desert



US Air Force Photo

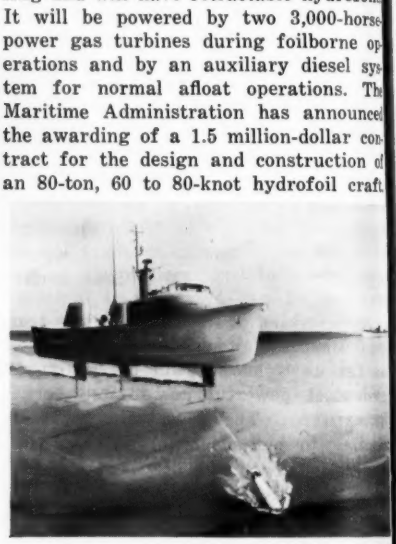
X-15 released from mother ship

at speeds up to 1,700 miles an hour. The *X-15* is a combination aircraft and rocket with potential speeds of 4,000 miles an hour and an altitude capability of 50 miles or more. Previous flights by the manufacturer's test pilot have taken the aircraft to altitudes of 80,000 feet at a speed of 1,400 miles per hour.

The manufacturer of the *X-15* has proposed that a two-place version be boosted into orbit around the earth by a two-stage, high-thrust rocket. This proposal envisions no change in dimensions or configuration beyond the provision of external propellant tanks and retrorockets. The engines of the rocket plane burn a water-alcohol compound and liquid oxygen. The engine planned for ultimate use in the vehicle will burn ammonia and liquid oxygen and will be three times as powerful as the one now in use. Normally, the *X-15* is air launched from a mother ship before its rockets are fired. It then climbs to altitude under its own power.—News item.

Hydrofoil Craft

Increased interest in hydrofoil surface vessels has been indicated by recent actions of the Navy and the Maritime Administration. The Navy has asked for bids on a 110-ton hydrofoil high-speed patrol craft to be used to detect and destroy modern submarines. The proposed aluminum hull craft will be 115 feet long and will have retractable hydrofoils. It will be powered by two 3,000-horsepower gas turbines during foilborne operations and by an auxiliary diesel system for normal afloat operations. The Maritime Administration has announced the awarding of a 1.5 million-dollar contract for the design and construction of an 80-ton, 60 to 80-knot hydrofoil craft



US Navy Photo

Hydrofoil patrol craft

Launching is expected by June 1961. These vessels are designed to operate in the open seas. They employ hydrofoils to lift the hull out of the water and thus eliminate the drag normally encountered by a surface vessel.—News item.

Army Student Body

The United States Army's 30 service schools and colleges are estimated to have a total student body of 150,000 individuals enrolled in 642 resident courses. An additional 130,000 are enrolled in non-resident courses.—News item.

Missile Television Camera Successful

The television camera damage assessment device designed for use in the *Redstone* missile (MR, Apr 1960, p 71) has been tested successfully at the White Sands Missile Range in New Mexico. The camera, carried in a small capsule, was ejected from a *Redstone* missile in flight, and while falling to the earth took pictures of the impact point of the warhead. The pictures were transmitted to a receiver 75 miles from the impact point. The pictures were recorded concurrently on video tape to permit future detailed study. In operational use, the pictures would provide an immediate evaluation of the result of the strike. Tests earlier this year evaluated the behavior of the capsule only.—News item.

'XM70 Moritizer' Tests

The 115-mm rocket-boosted artillery piece, developed by the US Army Ordnance Corps for the Marines (MR, Feb 1960, p 71), has encountered considerable success in initial firing and transportability tests. The *Moritizer* is a lightweight artillery weapon incorporating the characteristics of the mortar and the howitzer. It employs two 3-chambered clusters of breech tubes mounted side by side. Each cluster revolves like the cylinder of a revolver, moving rounds into position for firing through a single launch tube. Each weapon can fire a salvo of six rounds in two and a half seconds. The Marine Corps plans to have its first six-gun battery in the field by February 1962. The weapon is adaptable for direct and indirect close support missions, and can employ point-detonating or proximity fuze rounds.

US Marine Corps Photo

Rocket-boosted *XM70*

The lightweight characteristics of this artillery piece give it great mobility. It is helicopter or aircraft transportable, can be manhandled by a five to seven-man crew, and can be towed by a ¾-ton vehicle. After firing more than 1,500 rounds in the new weapon, the Marine Corps has evaluated it as being the most significant improvement in conventional United States artillery since 1940.—News item.

US Marine Corps Photo

Helicopterborne *Moritizer*

Nuclear Space Engine

The National Aeronautics and Space Administration (NASA) is negotiating an eight million-dollar contract for construction of a nuclear-powered space engine. Specifications call for the engine to weigh about 1,500 pounds, develop approximately 30,000 watts of energy, and operate for at least a year. NASA anticipates that the generator should be ready for flight in five years.—News item.

New Helmet Liner

A new nylon helmet liner, which will have greatly improved ballistic resistant characteristics, may soon be available for United States forces. The liner will replace the molded cotton fabric liner used during World War II.

The basket weave nylon fabric, developed by the United States Army Quartermaster Research and Engineering Command several years ago, resists penetration by shell and grenade fragments. When the fabric is struck, the energy of the moving fragment is dissipated away from the point of impact along the nylon threads.

Production costs and manufacturing time have been bottlenecks to the acceptance of the nylon liner. Production techniques involving the use of new plastic resins to give the ballistic resistant nylon the stiffness needed for it to be molded into helmet liner shape may make it feasible to produce the liner at reasonable cost. A 12-ply vest of this fabric was widely used as an individual protective garment during the Korean War.—News release.

Polar Research

The United States Army's 1960 Polar Research and Development Program got under way with the arrival early in May of a major portion of the scientific personnel and support elements scheduled to work at Camp Tuto, Greenland, this year. Camp Tuto is the Army engineer base for polar research, and provides support for all research and development in Greenland including construction of the undersnow city, Camp Century (MR, Apr 1960, p 71). A recent agreement with Denmark, owner of the ice-capped island, has paved the way for installation of a *PM-2A* portable nuclear reactor to furnish power and heat for Camp Century. This powerplant will produce about 1,500 kilowatts of electricity plus about 1,000 pounds of steam per hour. Utilizing the nuclear powerplant, power for one year can be produced by less than one aircraft load of enriched uranium fuel. A diesel plant would require one million gallons of fuel to produce an equivalent quantity of power.—News release.

AUSTRALIA

Major Reorganization Of Army

The operational strength of the Regular Army is to be increased by one-third as a part of the reorganization of the Australian armed forces. Major changes include the reorganization of the current infantry divisions into "pentropic" divisions of five battle groups each (MR, May 1960, p 73). The objective of this change is to increase operational efficiency, especially in tropical warfare. Approximately 67.5 million dollars will be invested in modernization of equipment during the next three years. The Citizen Military Forces, formerly made up chiefly of conscripts, will become a part-time army of 30,000 well-trained volunteers.—News item.

'Aeolus' Test Rocket Fired

Australia's new low-cost research rocket, the *Aeolus*, has been successfully fired at the Woomera Rocket Range. In its initial test the rocket reached a height of 80 miles and was evaluated as being nearly ready for use in the Australian space research program which calls for the launching of space rockets within six months. The *Aeolus* is 21 feet long and weighs about half a ton. It has a speed of 3,000 miles per hour at burnout and carries up to 50-pound payloads.—News item.

'M60' Machinegun Adopted

Training with the United States-designed *M60* machinegun has started at the Australian Regular Army School of Infantry. The *M60*, a general-purpose machinegun, has replaced the *Bren* and *Vickers* machineguns. It is an air-cooled weapon that can be fired by one man from the hip or the shoulder.—News item.

SOUTH AMERICA

South American Armed Forces

Country	Population	Army	Navy	Air Force	Armed Forces
Argentina	20,000,000	90,000	28,000	12,000	130,000
Bolivia	3,000,000	12,500	——	2,500	15,000
Brazil	63,000,000	142,000	45,000	35,000	222,000
Chile	7,500,000	20,500	8,500	13,000	42,000
Colombia	13,000,000	32,000	4,000	1,000	37,000
Ecuador	4,000,000	10,000	500	200	10,700
Paraguay	1,600,000	9,500	800	200	10,500
Peru	10,000,000	43,000	10,000	20,000	73,000
Uruguay	3,000,000	9,000	2,000	3,000	14,000
Venezuela	6,000,000	22,000	5,000	8,000	35,000

The 10 independent South American countries have a total of 589,200 men under arms. The chart above breaks out the armed forces of each country by service.—News item.

ITALY

'Jupiters' Operational

Fifteen United States Army-developed *Jupiter* intermediate range ballistic missiles (IRBM's) are reported on their launching pads at Italy's first IRBM base. Location of the base has not been disclosed. It was announced in the United States last October that 15 *Jupiters* were being shipped to Italy. Italian missile crews were given technical training on the missile at the Army Ordnance Guided Missile School at Huntsville, Alabama, last fall (MR, Nov 1959, p 84).

The *Jupiter* is a 60-foot, 110,000-pound, liquid fuel missile with a range of 1,500 nautical miles.—News item.

ISRAEL

Airport Modernization

Lydda Airport, 15 miles southeast of Tel Aviv, is being improved by the addition of an 8,860-foot runway. The new facility may be extended to 9,850 feet when required.—News item.

JAPAN

Airpower Grows

A recent announcement stated that Japan now has 450 battle-ready jet fighter planes and over 1,000 reserve, training, and transport aircraft. A major portion of the fighter aircraft are *F-86F Sabre* jets which were built in Japan.—News item.

USSR

Chinese-Russian Translations

The Soviet Union is developing a machine, similar to one now being used in the USSR to translate the English language, that will translate complicated Chinese characters into the cyrillic alphabet.

Work on mechanical translation of English was begun at the Soviet Institute of Scientific Information, Academy of Sciences, in 1955. A machine with a vocabulary of 5,000 Russian and English words has met with some success.—News item.

GREAT BRITAIN

'SC-1' Tests Successful

Britain's jet vertical takeoff and landing (VTOL) aircraft, the *SC-1* (MR, Jan 1960, p 76), has demonstrated successfully its ability to take off vertically, hover, convert to wingborne forward flight, and return to a jetborne hover. Previous tests

Vertical takeoff and landing jet

had demonstrated the VTOL capability of the aircraft. The *SC-1* is considered by the British to be a major breakthrough in the VTOL field which may lead to the development of supersonic jet transport aircraft with a vertical ascent capability.—News item.

FRANCE

Fallout Warning System

Numerous police stations throughout France have been equipped with radioactivity monitoring devices. These devices, which are provided with Geiger-Müller tube detection units, operate around the clock and can be set to provide automatic warning via an electric alarm when specific levels of radioactivity are exceeded. A second detection unit mounted 250 meters above ground at many stations records the higher intensities of radiation. These readings, when used in conjunction with the readings from other stations, provide information from which the fallout pattern can be determined.—News item.

SWITZERLAND

Strengthening Of Armed Forces

The Swiss Army will be provided improved firepower, improved mobility, and a modernized force structure under programs recently made public. Annual expenditures for military purposes will be increased about 50 percent over the current figure to accomplish these objectives. The maximum age for compulsory military service will be reduced from 60 to 50 years.

Reorganization of forces will create three major components: frontier and redoubt troops to man the mountain frontier defense posts; a mountain corps consisting of three mountain divisions; and a field army of three infantry divisions and three motorized divisions.—News item.

CZECHOSLOVAKIA

'HC-3' Helicopter Production

Production has started on the *HC-3* five-seat helicopter. The *HC-3* is powered by a 240-horsepower, six-cylinder engine and can be used as a flying crane or for other conventional helicopter duties. It has a maximum speed of 100 miles per hour and a gross weight of 3,086 pounds. —News item.

DENMARK

'Nike' Defenses Operational

The first non-American *Nike* air defense unit in the North Atlantic Treaty countries became operational recently. Denmark has declared the four missile batteries in position around Copenhagen to be ready for duty.—News item.

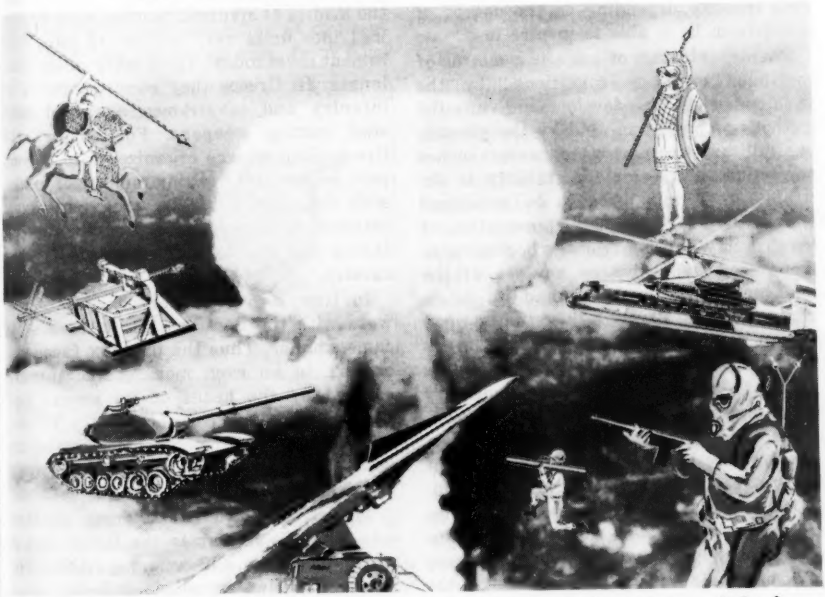
COMMUNIST CHINA

Increased Steel Production Goal

Communist China plans to increase her steel production to 18,400,000 tons in 1960. This represents a 38 percent increase over last year's production, but is less than the 19 million tons originally programed for 1959.—News item.

MILITARY DIGESTS

THE EVOLUTION OF NUCLEAR TACTICS



One of the major problems facing the modern tactician is to retain from experience that which remains valid while rejecting that which modern technology has made obsolete. Thus evolves the doctrine for nuclear warfare. The following digests present the story of the development of our basic combat unit—the division—a unique proposal for a revolutionary new organization to supplant the division, a discussion of night operations under conditions of nuclear warfare, and an analysis of Soviet tactical doctrine as influenced by modern battle conditions. The concepts presented are those of the authors and are not necessarily endorsed by the U. S. Army Command and General Staff College.—Editor.

Evolution of the Infantry Division

Translated and digested by the MILITARY REVIEW from an article by Lieutenant Colonel Afonso von Trompowsky in "Mensário de Cultura Militar" (Brazil) November-December 1959.

THE object of this article is to trace in general terms the evolution of the infantry division from the point of view of its organization and its employment.

The infantry division is like a live being. It answers the voice of its commander slowly or eagerly and with audacity or with timidity depending on the degree of enthusiasm he is able to inspire in it.

The organization of units is a matter of continued evolution conditioned by the technical-scientific development of the methods of operation, and by the prevailing military doctrine. One never reaches perfection, but a certain stability is desirable to permit units to be organized and trained for war. An appreciation of the infantry division from its beginning to the present will give us an idea of the meaning of this evolution and its determining factors. Through this study we can gain a fairly good idea of what the infantry division will be in the near future.

The French declare that all military knowledge consists of a fixed part, *principles*, and a mutable part, *procedures*. The first are learned through the study of history. The second, whose continuous mutation is due to the development of science and technology as well as the general conditions of the moment, are considered from a positive standpoint. It is through the judicious use of these two parts of military knowledge that a useful historical extrapolation can be made in preparation for a new war. Thus is avoided the absurdity that a technical-scientific development such as the atom bomb would annihilate all other knowledge in the science and art of war; that everything should be started anew to enable us to face new conditions. Those who act in this manner ignore the teachings of centuries of the history of humanity. As stated in Bismarck's famous aphorism: "The foolish say they only learn by personal experience. I prefer to learn from other people's experience."

Well before the appearance of the firearm and still in the so-called classic age, the armies of civilized peoples were organized into units very similar to our basic combat units today. These were called phalanxes. In Greece they were composed of infantry and cavalrymen equipped with steel cutting weapons. For combat the Greek phalanx was organized into a compact mass with a varying number of ranks, with the cavalry on the wings. Intervals between ranks were one yard for the infantry and two and a half yards for the cavalry.

In time, and as a consequence of the wars with the Persians, the intervals became smaller. Thus the phalanx faced the cavalry in an even more compact mass, covered by the heads of its spears and barring the advance of the cavalry. It was, however, a very cumbersome disposition without mobility and almost exclusively a defensive formation.

The disposition of the Roman phalanx was, at first, similar to the Greek and it was employed in a like manner. About 360 B. C., Camillus organized a *legion* as a larger combat unit which was much more flexible and suitable for offensive actions. It was composed of 30 *maniples*, each consisting of about 100 men disposed in 10 ranks. Later, an intermediate echelon, the *cohort*, was organized consisting of three maniples. Each legion had 10 cohorts. These subdivisions and the formations they made possible gave the legion much more flexibility than the phalanx. The latter—compact as it was—could only maintain

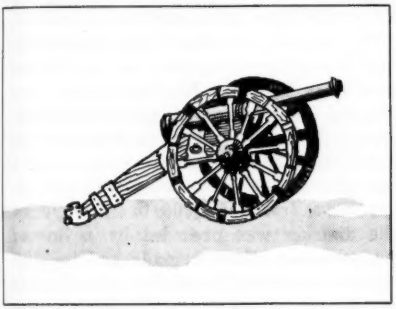
the cohesion necessary for hand-to-hand combat in level terrain without obstacles.

Advent of the Firearm

The Middle Ages brought an involution in the art of war. It was not until the advent of the firearm in the 14th century that real progress was possible.

The regiment appeared in France during the reign of Louis XIII (1601-44). This regiment originally had 12 companies and later was organized into battalions.

Much later in the 17th century Turenne adopted the brigade consisting of two regiments of two battalions each from Gus-



Light artillery piece of Gustavus Adolphus

tavus Adolphus, King of Sweden (1611-32). The brigade combined great strength with responsiveness to command.

With the exception of the armies of Gustavus Adolphus, the composition of armies prior to Turenne had been based on massive, compact formations. The infantry regiments and brigades were formed into a single larger unit. The artillery was dispersed across the front forward of the infantry. This was necessary because of limited mobility and the short range of the weapons. The cavalry normally would be placed on the wings. The army was thus a powerful and united organism designed for actions in force in accordance with classical concepts. Impaired mobility and the lack of maneuver space between units deprived these formations of flexibility. The larger the army the more serious the problem. Turenne concluded that an army should not have a strength of more than 50,000 men. Such an army required mobility if it was to exploit the strategic and tactical advantages afforded by maneuver. This required forces that could be divided into standard groups which could live, move, and concentrate for battle. The army was, therefore, divided into fractions which were called "divisions" since they were actually subdivisions of the army.

Development of the Infantry Division

The history of the infantry division is interlaced with the history of the relationship between the three arms. Balance between the arms constantly changed due to the technical development of the combat means unique to each.

It required three centuries after the advent of the gun on the European battlefield for the artillery to take its place among the combat arms and alongside the infantry and cavalry. The power and mobility of the field gun established the position of the artillery in the 18th century.

Taking as a point of reference the events which took place in the French Army, development of the division is divided easily into three periods as follows:

From the 18th century to 1914.—Each arm executed its role independently; the higher command was responsible for the concentration of effort through the contiguity of the effects of each arm. This was the period of contiguity of the arms.

From 1914 to 1939.—The increase in firepower, which temporarily eliminated the cavalry from the field of battle, dictated close liaison between the infantry and the artillery at the division level. This was the period of liaison between the arms.

From 1940 until today.—After a short period in which the armored division supplanted the infantry division, combat began to require a closer combination of the

arms. This led to the grouping of all arms into a combined-arms combat team at an echelon below the infantry division.

Contiguity of Arms

As firepower increased the cavalry progressively lost its place of importance on the battlefield; concurrently, the importance of the artillery increased. This led to a balance between the infantry, cavalry, and artillery which established a fixed order of battle. The unified organization operated in accordance with standard procedures irrespective of its commander.

Operations in the 17th and the beginning of the 18th centuries followed one of two different schools: that of the "lineal disposition" or that of the "disposition in depth." The works of Guibert introduced an intermediate formula which, through the simple movement of columns of battalions, made it possible to pass with relative speed from the column or "order of march" to the "order of battle" or lineal formation, and introduced an element of flexibility into the armed masses.

The concept of an autonomous division appeared at the beginning of the 18th century. The first division organization adopted by Marshal Saxe included two infantry brigades, two cavalry brigades, and elements of artillery.

In 1759 Marshal Broglie adopted this type of organization, but his divisions were made up of either infantry *or* cavalry with supporting artillery.

The real beginning of the present division was during the French Revolution when Carnot organized the composite division of the army with a strength of 15,000 and the capability to conduct independent operations. This division contained two infantry brigades of two infantry regiments each, one brigade of two cavalry regiments, one foot artillery battery of eight pieces, one horse artillery battery of six pieces, a division train, shop vehicles, and, occasionally, bridging equipment.

The clumsiness of this organization was soon felt, particularly by the cavalry. Napoleon was able to avoid this inconvenience, without abandoning the division principle, by splitting the elements of the composite divisions into cavalry and infantry divisions. The latter included two infantry brigades of two infantry regiments each, and a division artillery of one foot artillery battery and one horse artillery battery. The infantry division became the basic element of the frontline. The cavalry division was the instrument for exploitation and pursuit. In addition to the divisions, the Emperor maintained a heavy reserve of artillery and cavalry for intervention at opportune moments.

The infantry division was unable to maneuver rapidly; therefore, its capabilities were very limited. The battalions were no more than "pawns" of fixed dimensions that could be aligned or deployed in columns only. The infantry division used a lineal formation as it closed with the enemy on a front of 1,000 to 1,500 yards. The division was preceded by a line of sharpshooters. Each brigade had its first regiment deployed in battle (battalions in lines of three ranks) and the second regiment in closed column. For an assault requiring shock action, the front was reduced by the employment of the battalions in column.

The liaison between the arms was accomplished at army level. Within the division there was only a successive effort by each of the three arms.

The infantryman could approach to within a certain distance from the objective without suffering losses and could repel all cavalry charges. The artillery, using only direct fires, was interspersed in the infantry formations. Once the forces were engaged, the artillery became inactive and the brunt of the action fell on the infantry. The cavalry only intervened in the action to finish it or to exploit success.

The unusual freedom given the infantry divisions of Napoleon in the campaign of

1796 in north Italy suggested the organization of the army corps. By 1800 the concept of the corps had been accepted. The division served only as a means of incorporating men and materiel for combat operations.

Jomini, the Swiss officer who served under Napoleon, described the division as follows: "The division is a combat unit. The commanding general of the division commands all arms and services."

From 1805 to 1812 the organization and capabilities of the infantry division remained practically unchanged. There were no great advances in armament and combat techniques, other than a sharp increase in the range of the guns, until the end of the Napoleonic era.

1815 to 1870

The fall of Napoleon and the defeat of France took from that country its leadership in the art of war. This period marked a retrocession in the French infantry division. The new regime did not retain it as an organization in time of peace.

In the Second Empire the prevailing regulations declared that the division was the basis of all formations in the army and that this unit consisted of forces from all arms in the necessary proportion. In spite of this, the regiment continued to be the basic unit in peacetime. The same regulation established the use of the infantry division in two lines with a reserve of riflemen as replacements. Thus the infantry division lost its already small maneuverability.

During this period, however, the real capabilities of the arms were modified completely. In spite of the lack of interest of the army in this half century, industrial development brought two innovations in the evolution of weapons—the appearance of grooved gun barrels and breech-loading firearms. The range of the rifle was increased from 330 to 1,100 yards and the system of breech loading permitted firing in a prone position and from cover. The infantry could no longer advance to assault distance without suffering the consequences; it needed support to advance under enemy fire. The range of artillery was increased to 3,300 yards and it was capable of firing faster. Firing over friendly troops became possible. The artillery not only laid down preparatory fire but continued its support throughout the engagement. The cavalry ceased to be a shock arm and had to leave the battlefield proper. The increase in firepower, favoring the defense, required reorganization that would permit this increased power to be used in the offense.

France failed during this period. Her infantry, although armed with the excellent chassepot rifle, blindly adhered to a doctrine of static defense. The artillery adopted the grooved gun and time fuses, but rejected the breech-loading weapon as being too difficult to aim. So as not to complicate the work of the gun crews, the use of the time fuse was limited to two distances, 1,400 or 1,800 meters. Thus the French sacrificed the flexibility of artillery. The professional army of the Second Empire, known for its contempt for anything intellectual, could not exploit the new capabilities afforded by industrial and technical developments.

Prussia, however, remembered the experiences of the campaigns of 1813, 1814, and 1815, and particularly the defeats suffered. She proceeded with the evolution which ended in the campaign of 1870. The Prussian infantry division of 1870 had two infantry brigades. Each brigade consisted of two infantry regiments of three battalions. It had a cavalry regiment of three troops and an artillery group of four batteries of six guns each.

In the American Civil War (1861-65), the first really total and modern conflict, the infantry divisions of General Lee were organized with three to four infantry brigades and an artillery brigade of three or four batteries.

In 1873 France adopted an organization similar to that of the Germans. The new French division had two infantry brigades with two infantry regiments of three infantry battalions each, one cavalry troop, and an artillery group of two artillery battalions of four guns each and one machinegun battalion. These infantry divisions had little autonomy, for all logistical elements were centered in the army corps.

1875 to 1913

During the period 1875 to 1913 a defeated France was occupied feverishly in the organization of the so-called "army of revenge." She maintained the army corps as an essential element of the organization which included cavalry, artillery, engineers, and all the services. The infantry division, an organic unit in time of peace, was not considered an independent unit in the tactical sense of the word. It was simply an element of the corps. Its capabilities were very similar to those of Napoleon's infantry division. Rigid lines of riflemen, with only one step separating them, continued to be the only combat formation. Machineguns were not deployed in the frontlines, but were located with the artillery. The employment of the artillery was still independent from the infantry. It supported the attacks, but did not lay down preparatory fires, and concentrated mostly on epic duels with the opposing artillery. Liaison between the arms did not exist because of the lack of required communication means.

At the beginning of World War I the divisions of both Germany and France were organized with two infantry brigades of two infantry regiments each. The French division had a division artillery with three artillery battalions of 75-mm guns, one or two cavalry troops, and an engineer company.

The German division had two artillery regiments, one cavalry regiment, and a bridge company. The German artillery had 105-mm and 155-mm artillery weapons which gave it fire superiority over French units.

Liaison Between the Arms

France, who in 1870 had ignored the tradition of movement established by Napoleon and exaggerated the value of the defense, entered World War I with a completely different attitude. She adopted an offensive policy which subordinated firepower and the value of ground organization. It was at this time that she recognized the requirement for liaison between the arms. It was first necessary to establish the level at which liaison should take place. The commanding officer of the army corps was too far away to be able to coordinate the action of the infantry and artillery. The capabilities of the artillery in range and deflection were too great to be submitted to the control of the regiment. At times the regiment required the fire of more than one artillery battalion. Close personal liaison between the regimental commander and his supporting artillery commander was precluded by the lack of adequate communications and their physical separation on the battlefield. The division, therefore, was the ideal echelon at which to establish liaison between the two arms.

The infantry, with the removal of the cavalry, was now entirely responsible for ground maneuver. In the attack it had to advance 1,000 yards under fire toward the line of concealed riflemen. It could progress only when the artillery silenced the enemy guns. Hence the phrase: "The artillery conquers, the infantry occupies." A single machinegun could check a battalion. The successive employment of the two arms was no longer sufficient to assure victory; it was imperative to have a close liaison between them. Rolling barrages preceded the infantry assault waves at preset intervals. Because of the lack of communications, the infantrymen, delayed by some unforeseen contingency, would often see the barrage of fire disappear ahead of them.

The adoption of the automatic weapon was the first stage of a radical change in the organization and tactics of the infantry. The firepower which this weapon gave the forward elements permitted the replacement of the 50-man sections of riflemen with a small group of men capable of infiltrating through the gaps in the enemy lines. This was the first appearance of the squad which was capable of fighting independently and which eventually gave the infantry great flexibility of maneuver. Its riflemen and machinegunners permitted a combination of fire and movement while closing with the enemy for hand-to-hand combat.

The improved capabilities of artillery weapons and the excellent support provided the infantry made it possible to integrate fire and movement at the division level. Therefore, the control of operations passed from corps to the division. The division was given logistic capabilities to support its operations.

It should be noted that the Russian Army had given the division great logistical autonomy from the beginning due to the vast regions in which it normally would operate.

The response of the artillery to the requirements of the infantry was slow, due to the rudimentary means of communications. The appearance of the mortar permitted the infantry to solve this most immediate problem.

The division headquarters was allotted an artillery command capable of receiving and controlling artillery reinforcement. The infantry was placed under the orders of a single commander and lost one of its regiments. Thus the division organization was provided with either three maneuvering elements, adopted in most armies, or four maneuvering elements as in the British Army. Although the British organization gave the division a greater capacity for maneuver, it had the disadvantage of requiring an even heavier division artillery, for artillery was allotted on the basis of one battalion per regiment.

The Italians adopted a division with only two maneuvering elements. This organization had a limited capacity for maneuver since it permitted only two formations —division in line or division in column.

The French division artillery was increased by one 155-mm howitzer battalion to match the firepower of the German artillery. Division artillery carried out all the fires that directly supported the advance of the infantry. Counterbattery fires and interdiction in the rear of the enemy were the responsibility of the artillery of the corps.

The introduction of the motor on the battlefield gave the division the means it needed to effect a breach in the line of combat. However, the tank had not yet replaced the cavalry, for it did not have the speed necessary to accomplish the specific missions of that arm. The desire to make the infantry division more maneuverable and flexible led to motorization, particularly of the support arms.

By the end of World War I the detailed control of tactical operations was entirely in the hands of the division commander. If the division were engaged in a breakthrough operation, the commander would concentrate his means to assure a penetration. His division, deployed in a square of three battalions abreast by three in depth, would attack supported by the tanks on a front of 1.5 to 2.5 miles with the objective of effecting a penetration three to five miles deep. If enemy resistance were weak, he might operate on a front of six to eight miles, decentralizing the action of his regiments and placing direct support artillery at their disposal. He would keep a maneuvering force of one infantry regiment and his general support artillery.

1918 to 1939

The French temporary regulations of 1921 regarding the tactical employment of larger units confirmed the transformation

of the infantry division. The regulations stated:

The infantry division is the lowest unit that can conduct, with its own means, an attack of certain importance; however, it has little capacity for sustained action. It is the basic larger unit, in whose operations the action of all arms is combined.

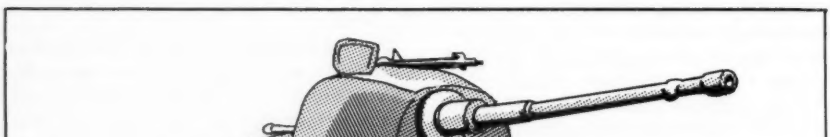
In theory, here is the idea of the combination of arms which came into its own during World War II. Combat forces generally were divided into three elements. These were: the maneuvering forces, usually under direct control of the division commander and consisting of infantry, tanks, and accompanying artillery; the support echelon, under the orders of the division artillery commander; and the reserve, composed of infantry and tanks.

The principal responsibility of the division commander was to combine and control the firepower at his disposal with a view to supporting the action of the infantry. Organically, the infantry division did not have any tanks, but the employment of these vehicles was foreseen in the division plans.

The division underwent little change between 1920 and 1940. At the beginning of World War II it contained three infantry regiments, each with its own howitzer company, a division artillery with three 105-mm howitzer battalions, one 155-mm howitzer battalion, a mechanized reconnaissance squadron, a combat engineer battalion, and logistical and administrative support units.

Combined-Arms Period

The repetition in 1940 of the mistake of 1870 with its tragic consequences finally alerted the French military thinkers to the dangers of basing a doctrine only on the teachings of the last war. They, therefore, abdicated the lessons from history which made it possible to distinguish between what is unchanging in the art of war and that which changes with technical development and the conditions of the times.



German *Tiger* tank of World War II

In 1939 the Allies professed absolute confidence in the infantry division. In spite of the defeat of the Polish Army under the onslaught of the German panzer divisions, they still believed in the superiority of the defense conducted according to plans drawn up in 1918. The artillery was to tear apart methodically the battle-line composed of infantry divisions deployed side by side.

A large portion of the Allied front fell quickly under the impact of the panzer

divisions supported by aircraft. For the first time the efficiency of the tank-radio-airplane trio was proved in battle. In six weeks of combat the French Army was defeated and abandoned the fight without engaging the bulk of the German infantry. The motor, replacing the horse, had returned to the cavalry the splendor it had lost. The tank gave it speed, power, and protection; radio gave it the means to control armored masses; the airplane gave it close fire support without the need for large and slow concentration of artillery and ammunition. The tempo of the operation was a complete surprise to the Allies.

The French infantry division, under air attack against which it had inadequate defense, soon lost its strategic mobility, making readjustment of the Allied dispositions impossible. The liaison of arms, organized rigidly for a war of position, failed completely in the war of movement which was imposed on the Allies by the Germans.

France returned to the war with a United States type division, organically very little different from the French division of 1939 but with very different characteristics.

The armored division in no way replaced the infantry divisions on the battlefield. At the end of the war the latter comprised three-fourths of the order of battle in all the belligerent armies.

Infantry weapons were unchanged except for the rocket launcher used near the end of the war. Artillery continued to be the power instrument of the infantry division commander. The engineers were considered one of the combat forces, joining the infantry and the tanks in opening the way through obstacles and minefields. Support of the infantry division with tanks and tank destroyers became standing operating procedure. Efficient means of communication permitted the organization of combat teams, for the first time allowing a real combination of arms. The combined-arms concept permitted the concentration of the total firepower of the unit upon a common objective.

Evolution After 1945

Since World War II the infantry division has been subjected to constant modifications, but there has been a lag in the development of the techniques of employment. The United States infantry division was given a heavy tank battalion of four companies, an antiaircraft automatic gun battalion, a replacement company, and an ordnance battalion in lieu of the light maintenance company.

The infantry regiment was given a heavy tank company instead of its former antitank company, a heavy mortar company, a medical company, and an artillery battery of six pieces.

Soon after the war the infantry division began to be considered as an element composed of three permanent combat teams plus divisional elements. This concept developed during the last months of the campaign when the combat teams were most often employed on isolated missions and on independent axes. Such employment was due to the mountainous terrain in Italy and to the type of pursuit and the width of the battlefront in France and Germany. It was customary to deploy the division in combat teams for training purposes in peacetime to develop proficiency in combined-arms operations and to develop the *esprit* and mutual respect between units of different arms.

By 1949 the tendency was to abandon the fixed combat team because it did not take advantage of the power and range of current weapons. The division was again the lowest unit to group within its organization forces from all arms. The division commander had responsibility for combining the arms in the necessary proportion to meet the requirements of the situation. Actions were carried out by combat teams of all arms. The commander of the infantry division controlled operations by the assignment of missions to the com-

bat teams, by the allocation of means to his subordinates, and by the employment of the reserve. The infantry division was capable of rapidly concentrating all its combat potential at the decisive time and place.

Present Trends

The evolution of organization and employment of the current infantry division brings up the question: What is the adequate organization for the infantry division in a future war? The specter of mass destruction caused by nuclear weapons will not permit, without great cost, the concentration of forces. The continuous requirement for avoiding the formation of worthy nuclear targets will necessitate constant dispersion of units and continuous movement. B. H. Liddell Hart's theories regarding the urgent necessity of reducing the "logistical umbilical cord" of the infantry divisions correct the situation that occurred in the last war when logistical personnel greatly exceeded combat personnel. The United States Army adopted a new organization for her infantry divisions on an experimental basis. In it, the idea of the combined arms is present. The new organization has five combat teams with power superior to that of the infantry battalion. Firepower is provided by conventional and nuclear weapons. Considering that the division's zone of action will be larger than that of the classical infantry division because of the dispersion necessitated by modern combat conditions, its employment is dependent upon modern means of communication. The concept which produced the organization of the combat teams is still in force.

The Soviets, while retaining their infantry and armored divisions, have adopted a mechanized division in which the fusion of arms is so complete that the result is an intermediate arm combining infantry and armor. Could it be that we are at the threshold of a fourth period of evolution of the infantry division—that of the integration of the arms?

As the dragoons of old who moved on horseback and fought on foot, the mechanized division is an effort to merge the flexibility of the cavalry with the endurance of the infantry. The appearance of the shaped charge during World War II had ensured the permanent existence of foot soldiers in the small armored units. Napalm and tactical nuclear bombs undoubtedly will require a change in the division structure.

The solution to the principal tactical problems of the attack and the defense will require the unified action of all arms. They will be combined more and more intimately in progressively smaller units. However, it does not seem that this combination will lead to the reappearance of the single, composite unit. The difference made by Napoleon between the infantry and the cavalry divisions, because of the tasks he assigned them, still exists: "Assure the firmness of the battlefront and exploit, through speed and flexibility, the gaps in the enemy battleline."

The strength of an army, like the power in mechanics, is estimated by multiplying the mass by rapidity; a rapid march augments the morale of an army and increases its means of victory.

Napoleon

The Nuclear Legion

Digested by the MILITARY REVIEW from a copyrighted article by Colonel G. W. H. Fellows in "The Army Quarterly and Defence Journal" (Great Britain) July 1959.

Man propounds negotiations, man accepts the compromise;
Very rarely will he squarely push the logic of a fact
To its ultimate conclusion in unmitigated act.

Kipling—*The Female of the Species.*

A WAR in northwest Europe must lead to a megaton bombardment of the home countries and to the annihilation of the antagonists. Such a war is, therefore, unlikely.

On the other hand, a war in the sparsely populated territories of the Middle East and Africa is quite possible. If the Soviet Union won, Europe would be starved of oil, and there would be a cataclysmic fall in the standard of living which would lead to communism. Thus victory in the Middle East theater is essential to Europe, but its achievement will require the use of nuclear weapons of increasing size. A nuclear attack on the Soviet mainland would be avoided for fear of retaliation. The Soviet Union would not attack the countries of Europe for similar reasons. Defeat in the Middle East, however, would not be disastrous to her or her aims.

In these circumstances, nuclear war would leave the home base free to send supplies to the theater of war (harassed from the air and by submarines), but the ports of entry, bases, lines of communications, and supply units would be destroyed by nuclear attack if they ever attempted to operate in the conventional way. Further, the normal order of battle of army, corps, and even divisional supporting troops would provide simple targets for nuclear attack because they are easily identified and semistatic in the conventional setting. Divisional and brigade units would hope to avoid atomization because they can be made fully mobile and can disperse. If they have to become static to defend ground, they can dig in.

The divisions and brigade groups as presently organized would become ineffective in the earliest stages of a nuclear war, for they depend on a vast and vulnerable complex of supporting and supply units. The destruction of any part of this complex cripples the remainder, thus a simple organization is the only one that can operate, survive, and win in a nuclear land war.

This article makes a tentative proposal for the radical recasting of the army structure. It outlines a simple organization which will enable combat units to fight effectively with a nuclear potential without the need for many army, corps, line of communications, base, or support and supply units.

Since the defeat of the Romans, armies have been formed as a heterogeneous organization consisting of an infantry backbone supported by cavalry, and later by artillery and numerous additional arms and services. This plan suggests a reversion to a simple and self-supporting homogeneous structure; the combat unit is, therefore, called the *Nuclear Legion.*

Equipment

The nuclear legion operates with three main types of equipment. A combined tank and self-propelled gun called *Romulus,* an all-purpose carrier called *Remus,* and the

Rotodyne helicopter. The size, weight, and performance given for the first two can be achieved by good engineering practice. The *Rotodyne* is already flying. The main features of these vehicles are:

Romulus

The *Romulus* weighs 26 to 28 tons and is not normally air transportable, but can be made so in an emergency. It has a speed of 20 to 25 miles per hour, which is adequate, with a good power reserve for bad going. The armor of the *Romulus* is equal to a conventional heavy tank and is arranged to give some protection against nuclear effects.

The gun caliber and chamber pressure are the minimum to enable it to fire nuclear ammunition with medium velocity. Conventional high-explosive antitank ammunition in this caliber will have high accuracy and lethality up to 1,500 yards. The gun can be elevated to about 60 degrees and will range to about 18,000 yards when firing conventional high-explosive ammunition in the artillery role. The *Romulus* fires high-explosive ammunition for tank and conventional artillery roles, nuclear for assault and annihilation roles. The vehicle stows 20 rounds of conventional ammunition.

Its long-life, pressure-charged, multifuel diesel engine has very economical fuel consumption; it carries fuel for 200 miles.

The reliability and life of the *Romulus* is from five to 10 times that of present tanks. It carries a crew of three.

A special feature of *Romulus* is its dual purpose, low-high elevation tank-artillery gun which fires both high-explosive and nuclear ammunition. The nuclear ammunition is not carried in the tank but is held centrally, either at the legion headquarters or farther back. There are 20 tanks in the legion, so whichever one is best placed to deliver a nuclear attack (with gun accuracy) has the nuclear shell delivered to it by carrier, helicopter, or light plane. This method of transport is a substitute for the long range of the heavy gun or guided weapons, it is simpler, lighter, cheaper and far more flexible, and it leads to important organizational advantages.

The *Romulus* is suitable for the artillery role because a small quantity of nuclear ammunition will replace the large tonnages that were required by the old type conventional artillery programs and concentrations, and because nuclear ammunition can be handled easily by a small crew in a small tank like vehicle.

A tank with a small crew (three men) can be designed with adequate armor protection to mount a medium caliber, medium pressure gun—all within the required weight limit. If a modest maximum range can be accepted, then the gun does not need to have either a very long barrel nor must it be very heavy.

Remus

The *Remus* is the basic tracked carrier and is available both as an unarmored load-carrying vehicle and as an armored personnel carrier and command vehicle. Tracks are unrivaled for cross-country ability and traction, wheels are best for load carrying; the cargo and personnel carriers both have the reserve engine power that will enable them to tow a two-wheel trailer with a two-ton payload. These trailers will carry the infantry-supporting weapons and the legion's reserves of ammunition, fuel, rations, and supplies. The armored personnel carrier can, if required, tow an armored personnel trailer which will double the number of men carried per vehicle. This combination of tracked tractor and wheeled trailor is the most efficient means of combining cross-country ability with high payload. The mechanical components and the characteristics of both types are shown in Figure 1.

The basic *Remus* has a flat-floored, rear-loading, clear cargo space and can be adapted to carry or tow any type of equipment which is organic to the present British brigade group.

A proportion of the personnel carriers can be equipped with 20-inch earth augers —centrally placed in the vehicle and engine-driven—which will enable the personnel of the legion to be put underground in a very short time should they be required to take the defensive.

Rotodyne

This vertical takeoff and landing machine is similar to the prototype *Rotodyne* except that it would have to be designed with a much smaller fuselage suitable only for carrying fuel, supplies and rations, and, occasionally, personnel. It would, therefore, be cheaper, faster, and have a better payload than the prototype.

A few *Mark I Rotodynes* with the full-size fuselage would be used for emergency replacements of vital equipment and for special operations. A flying availability of eight hours in each 24 hours for each serviceable *Rotodyne* would be required during operational periods to supply the legion, but at other times supplies would be sent by road from the base.

The *Rotodyne* supply system would enable the legions to be mobile over an area at a radius of 150 to 200 miles from their base; this distance could be increased for special operations.

Mobility and Fuel Supply

As the complete legion is carried in either *Romulus* or *Remus* vehicles, and has no other type of vehicle in its first echelon, it is completely mobile and independent of all roads. It is not quite certain whether either of these vehicles could be made fully amphibious, but they would be able to deep-ford and it would be possible to raft them across deepwater obstacles with comparatively simple rafting equipment.

Fuel is likely to be the heaviest aggregate load over a period of time (exceeded by ammunition for short periods), therefore, it is important that the number of vehicles in the legion be kept to the minimum, and that the vehicle weight be kept down so that a low fuel consumption can be achieved. (This is an important new concept as previously the only justification for limiting the weight of vehicles in the field has been the necessity to keep them within certain bridge classifications.)

CHARACTERISTICS OF THE *REMUS*

	Armored	Unarmored
Weight	Eight tons	Six tons (empty)
Speed	20 to 25 miles per hour	Same
Protection	Small arms, shell burst, and nuclear	Flash
Payload	Crew two, personnel 10	Three tons
Trailer (2-wheel)	Personnel 10 (or equipment of equivalent size and weight)	Two tons
Engine	Pressure-charged, multifuel diesel for long life and fuel economy	Same
Range	200 miles	Same
Reliability and life	From five to 10 times that of present carriers	Same

FIGURE 1.

Both *Romulus* and *Remus* vehicles have diesel engines which, in practice, can travel almost twice the distance that a gasoline engine can on a gallon of fuel. If diesel fuel is short, then their multifuel characteristic enables them to run quite well on gasoline.

Size of the Legion

The size of the legion is determined by the capacity of one *Rotodyne* to keep it supplied. In times of stress each *Rotodyne* might be expected to make four sorties every 24 hours, preferably at night. These four sorties should be sufficient to provide the legion with rations for one day, and sufficient ammunition and fuel. In quiet periods the legion would not require the full amount of fuel and ammunition, so the number of sorties could be reduced. In times of very high stress it would be possible to get in more sorties, or switch *Rotodynes* from other legions that were not fully committed.

On this basis the legion would comprise one *Romulus* squadron, one infantry company, one engineer platoon, one section of Royal Signals, one ordnance platoon, and headquarters and administrative personnel. The total strength would be approximately 300 men, 20 *Romulus* and 36 *Remus* vehicles, plus the two-wheel trailers. A suggested composition of the legion is shown in Figures 2, 3, and 4.

Communications, Maintenance, and Support

All vehicles are fitted with long-range radios containing built-in scramblers for security. These radios transmit by means of self-aligning radio relay to avoid countermeasures. Sets can communicate at will with each other, the base, and the *Rotodynes*.

The legion is a self-supporting mobile unit with its own nuclear potential. Therefore, it requires no supporting troops, except, perhaps, that it might be necessary to provide an engineer rafting company per division to take *Romulus* vehicles across deepwater obstacles. This rafting

Prototype *Rotodyne* helicopter

COMPOSITION OF THE NUCLEAR LEGION

ORGANIZATION

Subunit	Equipment	Number of Men	Role
Headquarters and armored squadron	20 *Romulus*	60	Assault
Infantry company	11 *Remus*	132	Attack
Engineer platoon	3 *Remus*	28	Mining, rafting, and landing strips
Ordnance platoon	3 *Remus*	28	Repair, servicing, and recovery
Signal section	3 *Remus*	10	Communications
Ammunition carriers	5 *Remus*	10	Administration
Fuel Carriers	5 *Remus*	10	Administration
Rations and supplies	2 *Remus*	4	Administration
Medical section	1 *Remus*	4	First-aid and evacuation
Miscellaneous	3 *Remus*	14	Quartermaster, orderly room, and technical supplies
Total	56	300	

FIGURE 2.

EQUIPMENT

Vehicles	Number	Types
Romulus	20	Gun tank
Remus	36	Armored personnel carriers and load carriers
2-wheel trailers	36	One per *Remus*

FIGURE 3.

LOGISTICS

Load *	Purpose	Approximate weight (pounds)	*Rotodyne* sorties
Fuels	150 miles	16,000	1
Ammunition	Refill	50,000	3
Rations	24 hours	2,400	
Supplies and repair parts	Maintenance	14,600	1

* Supplies and repair parts make up the load only when partial refill or refuel is required. This version of the *Rotodyne* is assumed to have a 17,000-pound payload.

FIGURE 4.

company would be the only supporting unit between the legion and its base.

In nonoperational times the legion would be maintained by wheeled transport from the base. This transport would be withdrawn when the legion commenced offensive mobile operations.

Both the *Romulus* and the *Remus* will be designed and developed to have a far higher standard of reliability and longer life than present equipment (the 200-hour life of current tracked vehicles is trivial compared to any other respectable major equipment). Their normal maintenance and repair would, therefore, be well within the capacity of the ordnance platoon which is organic to the legion. The mechanical maintenance problem is simplified greatly by having only two basic types of vehicles in the formation.

Heavy repairs and replacements would be carried out by mobile repair parties sent from the base when necessary.

Command and Control

One legion would be provided with the augmented establishment to enable it to command four other legions. These five legions would form a brigade. Brigades would be organized either in divisions or corps as required—regrouping would be extremely simple and could be arranged to provide a preponderance of either infantry or armor.

The base is the area where supplies from home are transferred to the *Rotodyne* for direct supply to the legions. These supplies would be brought in by small ships, barges, or load-carrying submarines and discharged across the beaches for storage in widely dispersed dumps. Such an arrangement is possible because the *Rotodyne* does not need an elaborate airfield to load and discharge its cargo.

Some of the usual administrative facilities would be located within the base area, and one squadron of about 10 *Rotodynes* per brigade probably would give sufficient availability for continuous supply during a reasonable period of operations. These squadrons must be part of the formation and under command.

It is clear that the logistic demands of the legions would be infinitesimal compared to those of a conventional force with its chain of supporting units. Thus the divisional base is a comparatively small setup which might be commanded by a brigadier with the senior air officer as his deputy, or vice versa.

Tactics

The legion is an offensive organization whose aim is to defeat and destroy completely the enemy army in the theater of war. The land campaign cannot be won otherwise.

Its tactics would be based on fully mobile operations and not the defensive holding of ground, frontal assaults, or heavy engagements. Its supreme mobility, combined with the flexibility of air supply, would enable it to encircle the enemy, destroy his command and communications, and then maneuver him into a position where he could be annihilated by nuclear firepower.

Real mobility will be the key to success and combat units will move fast, concentrate to destroy the enemy, and then disperse rapidly.

Lieutenant General Arthur G. Trudeau

Digested by the MILITARY REVIEW from an article by Lieutenant Colonel Jovan Kokoljevich in "Vojno Delo" (Yugoslavia) Issue 9, 1959. Translation by Mr. LaVergne Dale, Leavenworth, Kansas.

This article provides an insight into specific tactical concepts within the Yugoslav Army. Of particular interest is the apparent assumption by the author that both adversaries in any future war will be supported by tactical nuclear weapons.—Editor.

IN PAST wars, different countries and different military leaders have ascribed differing importance to night operations. Many of the leaders of the 18th and 19th centuries were definitely for the prohibition of night fighting. Frederick the Great openly declared that he had resolved never to undertake attacks at night. Blücher declared that he was more afraid of a night battle than of an enemy bullet. Napoleon thought that even though night operations might be crowned with success, they were most frequently doomed to failure. Clausewitz thought that night attacks should be undertaken only with a limited objective.

Yet contrary to the cited negative views, large numbers of night attacks have been conducted with great success. Suvorov, in a night attack in Poland in the vicinity of Warsaw, ordered approximately 25,000 men into the battle, routed the superior forces of his adversary, and killed or took prisoner about 12,000 of the enemy. In a night attack on a Turkish fortification at Kars in 1878, the Russians captured 17,000 Turks. The great army of Napoleon was harassed continually and disastrously by small cavalry units of the Russian Cossacks during the long winter nights.

As is well-known, there were many night battles in the Russo-Japanese War. In the beginning the Japanese were not inclined to engage in night operations, even of very limited scope, but the Russian superiority in artillery led them to conclude that it was better to employ night fighting. They studied various methods of conducting night operations and finally threw 23 battalions into a single night attack. In subsequent wars the Japanese made ex-

tremely good use of the experience they had acquired in night operations. In the Russo-Finnish War, superior Russian forces sustained heavy losses in night attacks conducted by the Finns. In World War II night fighting was increasingly developed and perfected, and became an important mode of operation, particularly on the Eastern Front and in Africa.

In the Yugoslav national war of liberation, night operations were employed widely. Small and large units frequently made use of darkness in the execution of their missions. Night attacks were made on both small and large enemy strong points, on inhabited places such as Belgrade where fighting continued day and night, and in the forcing of the Drina River at Ustikolina by the 1st Proletariat Division on 8 April 1943. These operations brought great successes against superior enemy forces even when the enemy was on the offensive.

Night operations attained unprecedented importance in the war in Korea. The Communist Chinese, especially, employed them with such success that they achieved decisive results in the face of their adversary's superiority in aviation and other combat means. The Communist Chinese and the North Koreans, in addition to night infiltrations, carried out night attacks with large forces and over broad fronts. In one such attack, carried out on a front of more than 100 kilometers, the South Korean II Corps was almost completely annihilated.

From the examples presented it can be concluded that night attacks were employed most often by the side that was either numerically weaker or less well-equipped than its adversary. It was considered the best way to inflict heavy losses on a better equipped enemy.

Current Concepts

Today, in all theoretical military thinking particular importance is attached to night operations. Not only numerically small and inadequately equipped armies concern themselves with the development and perfection of night fighting techniques, but strong and well-equipped armies also bestow careful attention on this matter. In a future war, operations frequently will be conducted day and night. Operations employing nuclear weapons will be fluid, and forces will occupy positions widely dispersed in width and depth. These conditions will favor the use of night operations by large and small units of all branches.

A few of the most prominent considerations relating to night operations include the problems of night fighting, employment of illumination and infrared means, and the conduct of the attack and the defense. When the basic problems which arise during night fighting are considered, emphasis nearly always is given to the psychological factors; command difficulties, including the danger of loss of direction of effort and of control over subordinate units and men; and difficulties in combat support and in coordination between units.

A fundamental requirement for the successful solution of these problems is the proper emphasis on night operations in unit and individual training. Since night fighting can no longer be regarded as unusual, training must include practice in the employment of weapons at night, in maintaining direction and contact, in overcoming obstacles, and in the construction of shelters. The training environment should include daytime operations which continue in darkness, operations exclusively conducted during the night, or operations which begin two or three hours before daybreak and continue into the daylight hours. It is necessary to discredit the practice of using periods of darkness primarily for the reorganization of units or for limited objective operations. All units, including the logistical organization, must participate in this special training.

In addition to good training of individ-

uals and units, success in night operations requires staffs that are well-schooled. A very important role is played by the staff in the detailed study of the terrain and of the enemy's capabilities and weaknesses. Detailed but clear plans, including plans to meet contingencies, rapid dissemination of information of the situation, and strong personal influence by the commander are all essential.

Excessive emphasis often is laid on the difficulties peculiar to night operations while their advantages are minimized. Nighttime conditions favor troop concentrations, render the determination of profitable atomic targets by the enemy difficult, detract from the effectiveness of his fire, and offer greater opportunities for surprise.

Illumination

Depending upon the situation, night operations may be conducted with or without the use of artificial illumination. If used at the right time, that is, after the operation has commenced, illumination will not necessarily destroy the element of surprise. It may be employed in offensive and defensive operations.

In offensive operations illumination will be employed primarily to assist patrols in night reconnaissance, to facilitate maintenance of direction, orientation on the terrain, the control of units, the coordination of direct support weapons, the detection and avoidance of minefields, and the overcoming of other obstacles. It may be used to illuminate the positions of the enemy or to deceive him by illuminating routes of advance that will not be used.

Illumination is used most often in an attack on a strongly organized defense. Adequate illumination of enemy strong points assists in target location and the adjustment of artillery fire. It also permits better orientation and coordination of the attack formations. An artillery and nuclear preparation usually will be fired to destroy enemy forces and to neutralize his fire means before an illuminated attack starts.

Illumination usually is not employed in an attack on a hastily organized defense or on a weakly organized defense on a broad front. Frequently, such an attack is carried out without artillery or nuclear preparation, however, the artillery will be registered and prepared to fire on call.

Plans for an unilluminated attack include provisions for illumination, should it be required. Such arrangements are necessary to avoid defeat if the defender employs illumination.

In defensive operations illumination may be employed to aid security elements in the timely detection of the enemy, to discourage enemy patrols and infiltration, or to detect an enemy night attack. It may be employed to assist night counterattacks and their support with fire; to render the movement of units and vehicles easier; and to aid in the location and evacuation of the dead and wounded. The defender who makes proper use of illumination may deprive the attacker of surprise and achieve better effects from his own weapons.

To light an area pyrotechnic signals, artillery light shells, aerial illumination bombs, and searchlights are used. In addition, devices for the use of infrared light are coming into more general use. Such devices permit the photographing of objects at distances of up to 45 kilometers, even through thin clouds and fog. Technical means permit the use of infrared light in a great number of engineer operations, such as:

1. Engineer reconnaissance.
2. Mine laying and mine removal.
3. Construction and marking of passages through minefields.
4. Construction of command posts, firing positions, and troop shelters.
5. Construction of bridges and the preparation of ferry sites.
6. Construction of roads.

The use of infrared light in engineer

tasks is especially appropriate where illumination is required and it is necessary to avoid detection.

Devices designed for the use of infrared light have a wide application in night operations, but there are limitations to their employment. The capabilities of these devices may be reduced considerably by heavy fog, snow, rain, and when the enemy uses specific countermeasures.

Offensive Operations

Night creates especially favorable conditions for the attacker. Troop concentrations have a better chance of escaping detection from the ground and the air. Moreover, a well-prepared and well-conducted attack at night may produce excellent results with a smaller loss in men and materiel than a daylight attack. Darkness prevents the defender from making massive use of aviation and frustrates his use of fire and counterattacks.

The night attack may be employed to escape heavy losses particularly from nuclear fires or enemy superiority in other materiel. It may be used to achieve surprise; to maintain the initiative; to develop success achieved during the course of the day; and to maintain uninterrupted pressure on the enemy, not allowing him to organize new defenses. It also may be used for deceiving the enemy, causing him to effect a concentration of forces in sectors of secondary importance; for capturing important objectives in the enemy defense positions; and for preparing favorable conditions for a general attack at daybreak.

The elements required for success in night attacks also apply to the undertaking of an operation during daylight, and if the schooling of units and staffs for night operations is given proper emphasis, the factors mentioned will present no particular problems. The idea that prevails in some armies—that elite units must be created for night fighting—is hardly convincing.

A night attack is a carefully planned and organized operation in accordance with an accurate estimate of the enemy, of his available forces and capability, of the terrain, and of atmospheric conditions.

The commander's reconnaissance should be conducted during the day. The objective of this reconnaissance is to select the principal directions of attack, establish missions for subordinate units, and arrange for coordination between units. At this time the commander also selects attack positions for the infantry and tanks and successive positions for the artillery, mortars, and searchlights, and determines the schedule and mode of illumination.

In the organization of night operations in general, and of attacks in particular, special attention must be given to the use of existing roads and to the control of communications. This is especially important under conditions of nuclear warfare, for extensive destruction or impairment of communications must be expected.

In night operations, combat dispositions are conditioned by the usual factors of mission, terrain, atmospheric conditions, available forces, and the forces of the enemy. As a rule lower units in the main effort attack in echelon. Frontages are comparable to those employed in a daytime attack. Dispersion is necessary to avoid excessive vulnerability to the nuclear fires of the defender. The depth of the objective depends on whether or not the attack will be illuminated and supported by nuclear weapons. An illuminated attack usually will have a limited objective.

Normally, preparations for a night attack are made on several axes. An attack on a single axis enables the enemy to concentrate all his fire in a single area and facilitates his conduct of a counterattack.

In planning for multiple attacks, the axes must be separated sufficiently from one another to afford the necessary protection from nuclear fires, but at the same time be near enough to one another to permit concentration of effort.

In planning the use of nuclear weapons in a night attack, it is necessary to take account of the vulnerability of one's own forces. In addition to the normal problem of the over-all security of the troops, consideration must be given to the blinding flash produced by these weapons with the attending possibility of injury to the eyes. For these reasons nuclear weapons will be used slightly before the beginning of the attack, both against the forward positions of the enemy and against his reserves. The time of their employment also depends on the plan of maneuver.

US Army Photo

Artillery in support of night operations

Timing the Attack

The beginning of a night attack depends on the mission received and the situation. When the aim of the attack is the exploitation of a success obtained during the day, the attack should begin after darkness. This prevents the enemy from bringing up reinforcements or regrouping forces in an imperiled sector. It also prevents the organization of a planned and covered retreat, or the preparation and execution of a counterattack.

If it is planned to follow a night attack with a general attack at daybreak, timing must allow for the attacking units to reach prescribed objectives, consolidate, and be ready to continue the attack or to permit the passage of fresh forces through their positions at dawn.

Coordination is very important in all phases of night operations. It must include:

1. The sequences and manner of moving into the attack positions.
2. The maneuver plan for the infantry, tanks, and artillery.
3. The support of the attacking units by the artillery.
4. Recognition signals.

5. The manner, place, and time of illuminating the battlefield.

In planning artillery fires, special attention is given to the establishment of lines to restrict fires and thus avoid firing on friendly infantry and tanks.

In order to satisfy the need for mobility and speed necessary to maintain continuous pressure on the enemy, tanks will be employed in operations at night as well as in the daytime.

Employment of Supporting Arms

Illumination helps to eliminate many of the shortcomings of armor during night operations. However, tanks may be used in unilluminated attacks as mobile firing points or, under some conditions, may make use of available light to maneuver with the combat formations of the infantry. The tanks usually are integrated into tank-infantry teams and employed in the first echelon of the attack.

In planning the use of engineers, the greatest attention is given to the ferrying of infantry, tanks, and artillery, as well as to the construction of passages through obstacles in front of and within the depths of the enemy defense.

Aircraft supporting the ground forces have the mission of destroying the enemy's reserves, artillery, searchlights, and radar; illuminating the battlefield; and conducting nuclear attacks.

Air support plans assign specific missions to aviation and include the time of execution, procedures for maintaining contact with ground forces, and restrictions on areas that may be bombed.

Usually, the night attack is undertaken by units in direct contact with the enemy; this is most desirable, for these units are more familiar with the terrain and enemy dispositions. If uncommitted forces are to participate in the attack, they should be moved forward in a formation that permits their entering into the fight immediately without having to regroup in the jumpoff position. At least the principal officers of the units that are to make the attack should have the opportunity to familiarize themselves with the terrain and the enemy's disposition.

In an attack on a fully organized defense a brief but powerful nuclear artillery preparation with a duration of not over 20 minutes is carried out. During this time the tanks and searchlights are moved into position. At the beginning of the attack, the searchlights most often light up the terrain over a broad front to deceive the enemy with regard to the location of the main attack. Every step is taken to seize the objective as quickly as possible. Leading elements do not remain on the captured terrain to clean up enemy remnants. These are liquidated by follow-up forces during the second phase of the operation. After the objective is captured consolidation is begun and preparations made for the repulse of a counterattack.

The reserve, as a rule, will move behind the forces in the main effort. Even though its commitment is planned for the continuation of the attack at daybreak, it is held in readiness for the repulse of counterattacks and the consolidation of the objective if the situation requires. Reserves necessarily may be committed to cover friendly forces if they are obliged to fall back.

If the attack has a limited objective, illumination of the terrain and a nuclear artillery preparation may be omitted. The artillery fire is opened on call of the lower unit commanders. Tanks remain in the jumpoff position supporting the attack with fire. The reserve, likewise, remains at the jumpoff position and enters the fight at daybreak together with the armored units to exploit success.

Defense at Night

In organizing a defense, account is taken of the possibility of enemy night attacks, and measures are taken to avoid surprise. It must be stressed that very broad frontages and great depth will be common to

nuclear warfare. This poses special problems in the organization and conduct of defense during the night. For successful defense under these conditions, reconnaissance and security measures must be intensified. Efforts must be made to deny reconnaissance and infiltration to the enemy. The intermediate expanses between units will be controlled by fire and obstacles and by special patrols and contact groups.

If a unit goes on the defensive when not in contact with the enemy, a security zone is organized employing all the requisite elements to prevent a surprise attack.

The size of the defense area is the same as for daylight defense. The combat disposition is such that forward defenses can be strengthened at night by units from the reserve. The reserve moves forward to be able to participate quickly in the event of a counterattack or to provide security in case of a retreat. Means for illumination are kept in constant readiness.

If the defense is carried out in contact with the enemy, the security zone of the enemy positions may be illuminated to aid in the timely discovery of an attack.

Nuclear weapons and conventional fires will be employed to break up prepared attacks by the enemy. Appropriate measures will be taken to prevent losses among friendly forces. The nuclear weapons will be used primarily against enemy reserves. Target information will be acquired during the day.

Enemy penetrations are contained as far forward as possible. When the situation permits, counterattacks are undertaken during the night to destroy such penetrations. A good knowledge of the terrain can contribute to their success. These counterattacks may be supported by tanks and artillery fire and, if the enemy forces are decidedly superior, by nuclear weapons. If the counterattack is supported by aviation, it normally is employed to isolate the forces in the penetration. Counterattacks made at daybreak can be more effectively supported by artillery, aviation, and nuclear weapons. If it is estimated that a counterattack cannot restore the lost position or if the counterattack at dawn has not been a success, the enemy forces which have effected the breach are blocked by fire and the forces in contact. The positions are held the following day and, if there are insufficient reserves to resume the attack, a withdrawal to a new position is carried out the succeeding night.

As we consider the conduct of operations in an eventual future war, it becomes evident that the capability of individual armies for uninterrupted action will be very important to success. Night operations will be a normal mode of action, participated in by large combined-arms formations.

The Army has moved farther in the past decade than any five decades of previous peacetime history. Instead of clinging to the concepts of World War II and Korea, we have prepared for a revolutionary advance in tactics.

General Bruce C. Clarke

The Pattern of Soviet Army Tactics

Digested by the MILITARY REVIEW from a copyrighted article * by L'Heretique in "The British Army Review" September 1959.

SOVIET tactics are not difficult to understand if one has a clear appreciation of the theories and doctrine of the old German tank masters. It is a little inaccurate to regard modern Soviet tactics as a slavish copy of those of the German because, in the interwar years, the two armies developed side by side with a fairly free exchange of information between them. However, Guderian's treatise on armored warfare was applied in the German Army (in the face of opposition by the older and more orthodox generals) after Hitler had broken off the liaison between the two armies. The new concept of battle was as great a surprise to the Red Army as it had been to France and Great Britain in 1940. Be that as it may, the Soviet Union is very quick to assimilate new ideas, and by 1944 her armored and mechanized formations proved that she had little to learn from the Germans.

Since the war the Soviet High Command has retained many of the German techniques and in some cases has improved on them. The Soviet Army has been reorganized and is reputed to have a strength of about 175 line divisions of which at least half are estimated to be of the armored type (tank, mechanized, and motor rifle). The German Army, on the other hand, even at the height of its power, had a very much smaller proportion of armored troops. The bulk of its fighting strength consisted of infantry divisions with horse-drawn artillery and transport. The Soviet High Command apparently has proved to its own satisfaction that armor and the Guderian design of battle are ideal for fighting a war under nuclear and non-nuclear conditions. Its conclusions should not be brushed aside lightly. As one of the foremost nuclear and rocket powers, it cannot be ignorant of the effects of the nuclear missile on the tactical battle.

Role of Tactical Airpower

One of the keys—if not the main key—to success on the battlefield lies in tactical airpower. In nuclear war tactical airpower becomes trebly important; the odds are weighted heavily against a force that must operate under conditions of tactical air inferiority. Although the rocket may relegate the long-range bomber to the museum, it can never replace the tactical fighter and the fighter bomber entirely. Aircraft are the eyes of the ground commander in nuclear war, and it is these aircraft which can most effectively gouge out the eyes of the enemy. Moreover, the inherent flexibility of the manned machine permits the engagement and destruction of mobile launcher equipment, tactical headquarters, and moving troops *on sight* without the problems of location and target response. This can be done quite effectively with conventional rocket or cannon fire. It is doubtful whether surface-to-air guided weapons will have any material effect on the tactical air situation, since large numbers of fighters scudding over the countryside at little above treetop level will saturate and destroy the guided weapon units.

Neither the German nor the Russian has ever believed that the air arm alone is capable of deciding wars or campaigns. The doctrine of Douhet has always been ridiculed. Nor does the Russian believe that wars will be won by the sole use of the nuclear missile.

As originally conceived the German ar-

* Reproduced from *The British Army Review* with permission of the Controller, Her Majesty's Stationery Office. United Kingdom Crown Copyright is reserved.

mored offensive relied on close and very heavy air support by ground attack planes. Soviet tank armies and tank divisions are designed to break into the enemy's rear and destroy him by the violence of their assault and the rapidity of their maneuver. Their organization and equipment is indicative of the tactics they will use. A tank division has between 400 and 500 tanks, but only 2,000 armored infantry which is few even by German standards.

Soviet *T54* tank

The deduction to be drawn is that these formations are designed to cover ground, avoiding serious engagement by maneuver. Should the enemy succeed in slowing them down, they will be assisted forward or extricated, as the case may be, by nuclear firepower or a very heavy weight of air support, or both. Tank formations need air reconnaissance and air cover since they eventually can be brought to a standstill by nuclear and air attack and the armored counteroffensive. In nuclear war their success and, indeed, their existence depend on tactical air superiority.

Soviet airmen of the tactical air forces are soldiers and not really part of a separate independent service. Each army group is allotted at least one air army consisting of more than 1,000 combat planes (of which the greater part are fighters). This air army is put *under command* of the ground force commander. Its main tasks, probably in order of priority, are as follows:

1. To keep all enemy aircraft, including the reconnaissance sneak, out of the sky. (Gaining and maintaining air supremacy is achieved by annihilating the enemy in the air and on the ground.)
2. Continuous reconnaissance.
3. Location and engagement of nuclear missile launchers and tank forces.
4. Interdiction and direct air support.

Influence of Technology

In making an assessment of likely Soviet tactics in a future war one has, in the former German panzer formations, a precedent or parallel. The fluid, fast-mov-

ing encounters which followed when German armor was engaged were rather close to the conditions of war in which the modern element of the Soviet Army is being trained to fight. Of course, there are differences. Soviet Army equipment is superior and its techniques are more sophisticated than those of the best German wartime divisions. Technically and administratively, there is no reason why they should not move farther and faster.

However, even in this technical age combat readiness does not depend entirely on equipment. Training, leadership, and morale have not lost any of their importance as battle winning factors. The standard of training in the Soviet Army tends to be very uneven, varying from the first rate to the very indifferent. Leadership also varies in quality, but in the main may be good. The doubt arises in the quality of the Soviet soldier.

That the Soviet soldier is able to discharge his technical duties efficiently, whether he be a gunner, driver, signaller, radar mechanic, or private of armored infantry, must be accepted. But that, in itself, does not necessarily complete the many abstract qualities required to make a first-class soldier. The German, on the other hand, did make (and probably will continue to make) an excellent fighting man. At the end of the last war men of 50 and boys of 16 were being committed to the line after only a few months' training and, within a week or so, were conducting themselves like veterans—fighting right to the end with dogged determination and skill against overwhelming odds in a despairing situation. Almost without exception they fought with bravery and daring, sometimes fanatical, but always devoted to duty. The German character is such that it takes easily to soldiering, and provided first-rate material to execute the earlier blitzkrieg doctrines. With the Soviet soldier, however, it is somewhat different. He is multinational and one must, therefore, be careful not to overgeneralize. Mainly, he is hardy and brave, but lacking in perseverance and dash. He cannot always be relied upon when he is in a tight corner. In the past he has tended to be cautious and deliberate.

Such characteristics do not fit in well with the Soviet concept of tactics which have been described. Nevertheless, many years have passed since the end of the war and much may have been accomplished by leadership and training. It is indicative that leaders of all ranks are continually being exhorted to use their initiative and show daring to the point of impetuosity, disregarding open flanks and enemy threats of envelopment. Although the Soviet soldier, man for man, will never equal the German, it must be remembered that the German standards were extremely high.

Forces and Frontages

The army commander has under his command two or three mechanized rifle divisions, each with more than 200 tanks and nine battalions of armored infantry, and one or two tank divisions, each of over 400 tanks and a small armored infantry component. The frontage of attack given to him will vary according to the army group (front) commander's battle plan, and may be as little as 30 and as much as 80 kilometers.

The Soviet field armies are not sufficiently numerous to engage the entire front in strength, and the first planning task is to select the sectors where the main effort will be made. This is in accordance with German doctrine where the main sectors were known as pivots or *Schwerpunkte*. Assaulting divisions will tend to concentrate toward these sectors; their frontages will be relatively wide however—12 kilometers or more to the division. On an army frontage of 50 kilometers, two or more divisions may be forward with one or two in reserve. Before the offensive starts, portions of the divisions in contact are kept well forward

close to the enemy and safe from the nuclear missile or they may be dispersed in depth to distances up to 20 kilometers. Other assault forces are kept back in still greater depth—up to 80 kilometers.

Offensive Operations

The design of the offensive is to hit the enemy while the attacking formations are on the move, whether they be reserve regiments of the forward divisions or complete divisions of the army reserve moving in rapidly from their dispersal areas. These units may be dispersed in regimental, battalion, and sometimes company groups. Effort is made to get enmeshed and through the enemy rapidly. Safety lies in darkness, in movement, and in close contact.

At the same time, the enemy is engaged throughout his depth by rocket, heavy air attack, and parachutists and partisans, all intent on destroying missile launchers, airfields, headquarters, and communication systems—the blitzkrieg all over again.

The army commander will intend to break through the enemy by the following means:

1. Armored and mechanized infiltration.
2. Outflanking defenses.
3. Direct attack (with or without nuclear fire).

The Russian is particularly adept at infiltration and is better at it than the German. Like the German, he will not attack if he can bypass and outflank, and when he is forced to attack, his main attack will come from the flank. On occasions, if conditions are fluid, he may attack a position from the rear.

Nuclear Tactics

The Soviet technique of attacking with sustained momentum ensures that there is no delay between the approach and the assault, and all deployment is carried out on the move. Such a technique is indispensable for an attack in nuclear conditions; it is used at all levels from division to battalion. Deployment areas and forming up places are dispensed with and there is no halting on a start line. In consequence, the likelihood of being caught in the enemy's nuclear defensive fire is very much reduced and the timing of the approach can be made to coincide with Soviet nuclear strikes so that their troops are able to exploit the effects of the fire before enemy remnants can reorganize. The technique is not entirely new however, because it is common to the armored troops of many nations and was used by the German panzer and panzer grenadier regiments. It can be carried out only by troops that have complete tactical mobility.

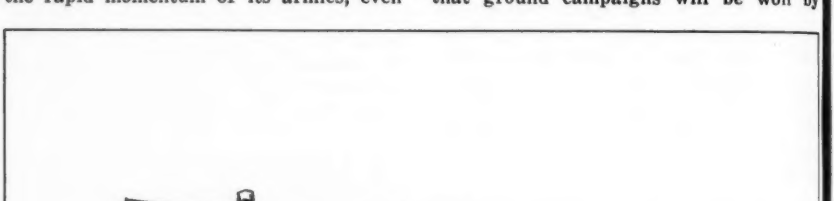
It is difficult and sometimes dangerous to generalize on the question of assault frontages and battle grouping. The tactics of the company and the Soviet tank and motor rifle battalion are the same for both nuclear and nonnuclear war. The only differences in nuclear war are in the scale of artillery support allotted and in the dispersion between battalions and between regiments. As for the rest, the tactics in both conditions of war are identical. The accent is on night movement and night fighting, infiltration, outflanking, and very rapid movement. Because of the need for dispersion and rapid movement, artillery and engineers often are decentralized and put under the command of regiments and battalions. Assault frontages for a motor rifle company or a tank company probably will be 500 yards or more; for a motor infantry battalion or a tank battalion they probably will be 1,200 yards or more. The motor rifle or mechanized regiment or the tank regiment probably will assault on a frontage of 4,000 yards or more.

In nuclear war it is probable that the scale of conventional artillery available would be comparatively light, and this deficiency presumably would be made good by the use of nuclear missiles, tank fire-

power, and direct fire guns. In nonnuclear war the scale of artillery support would be very heavy. Because of the danger of the treetop fighter aircraft, the field forces are now bristling with antiaircraft guns of all calibers.

Momentum in the Attack

The high command appears to be fully cognizant of the necessity to maintain the rapid momentum of its armies, even when faced with numerous water obstacles. Mobile bridging equipment is held in large quantities together with airborne formations, helicopters, and tracked and wheeled amphibians. In addition, armies have been equipped with substantial numbers of amphibious tanks mounting a 76-mm gun, and experiments are being carried out in crossing medium tanks under water.



Soviet armored personnel carrier

Such is the outline of Soviet assault tactics. In concept it is not very different from the pattern of German armored tactics in 1940 and 1941, but one must always remember that the Soviet Army has far more armored type divisions available than the German Army ever had. Future war, whether it be nuclear or nonnuclear, will be even more fluid and fast moving. Whether or not the Soviet soldier is capable of conducting this type of warfare time alone will tell.

However, it is what the Soviet soldier believes that matters. He apparently thinks that ground campaigns will be won by large ground armies consisting largely or entirely of armored formations, and that the plan of campaign will be based on the ultrablitzkrieg. Any campaign he undertakes probably will be based on the rapid maneuver of large numbers of tanks and armored troops moving under strong tactical air cover.

Dangerous Trends

A very large number of articles are appearing in the official and unofficial military press suggesting how the British Army should be reorganized to fight a

war under nuclear conditions. New ideas should not be discouraged because the day that officers cease to produce them will be a sad one for our service. However, let us keep our feet firmly on the ground and not accept an idea just because it is new.

The common characteristics of these articles are:

1. A determination to scrap existing British Army organizations and start again from the ruins. This is called wiping the slate clean.

2. A complete disregard of the tactics of the armies of the Communist bloc. In most articles they are not mentioned, and in some cases where they are discussed the author obviously has not the slightest comprehension of the subject.

3. A disregard of tactical airpower.

4. The use of the recurring argument "and let no one contradict me who has not seen the effects of the nuclear missile." But, has the writer? The Russians, however, have seen them.

5. A determination to be rid of the tank.

Most of these articles base the fighting of the battle around nuclear firepower. There is probably nothing wrong in this, but the authors seem to think that the battle will be won by this firepower alone, and they propose organizations which are nothing more than nuclear artillery units. The requirement for formations to carry out the task of fighting the land battle and exploiting and using nuclear firepower is ignored, or there is considered to be no such requirement. If many of these writers had their way, the entire British Army would belong to the Royal Regiment of Artillery. Admittedly, some of them propose to have an infantry escort for the launchers or guns, and some allot armored infantry to keep the enemy under surveillance and call for nuclear fire. Others foresee that a time may come when launchers become even lighter—jeep or man-pack affairs—but whatever the weight of the equipment the principle is always the same. One team picks up the target and another destroys it with few, if any, of our own troops on the ground for the serious business of fighting.

A little reflection reveals the weakness of these proposals. A British observation screen necessarily is weak and may be unable to hold even the enemy armored scouts (tanks and armored personnel carriers) at bay. These move dispersed and will, in fact, be part of the enemy's nuclear target acquisition organization. They, and the following troops, will either blot out our screen by nuclear strike, hit it on the run, or, more likely, hook in behind it and run straight for the launcher sites. An enemy who is highly mobile day and night may prevent our breaking contact at will. Once the enemy is among or behind the screen, the screen is lost because it does not have the necessary strength or tanks to fight its way clear. One can, as a despairing gesture, drop missiles on the screen, but the destruction of the enemy is not likely to be high, and it is doubtful whether it will affect the eventual outcome of the battle. Moreover, unless one has complete tactical air superiority the chances of survival of the nuclear launchers are not high.

The conclusions are inescapable. Tactical air superiority is essential to success. With it, ground forces, markedly inferior in numbers, can give battle with every assurance of victory. But we must have ground forces, fighting men and plenty of them, on the ground, but not in it. These fighting men must be tactically mobile and armored, with a very high proportion of tanks. The idea that the ground battle consists only of a nuclear fire fight must be corrected. Such a theory can lead us to disaster. Finally, let defense be based on offense. Shock tactics of the blitzkrieg type are best countered by the violent, fast-moving counteroffensive.

BOOKS OF INTEREST TO THE MILITARY READER

WEST POINT TODAY. By the Late Lieutenant Colonel Kendall Banning, Army of the United States. New revised edition edited by Colonel A. C. M. Azoy, Artillery, Retired. 256 Pages. Coward-McCann, Inc., New York. $3.95.

BY MAJ EUGENE P. FORRESTER, *Inf*

This is an excellent book for those interested in the history, legends, and atmosphere of West Point. Tastefully written and filled with a wealth of information which paints a vivid and generally factual picture of cadet life, it offers the reader a touch of today with an outline of the past.

It is obvious that Colonel Banning spent a great deal of effort in planning the original version. By using both American and West Point history as an effective backdrop, he has related the development of the senior national service academy. Similarly, Colonel Azoy has been able, in the revised edition, to reflect the major changes at the academy in the two decades just past. Unfortunately, as is often the case in such a work, minor errors do exist, but do not detract from the quality of the work.

All readers will find much of interest here presented in a logical and understandable manner. Although the style has been kept simple for the younger readers, anyone will find pleasure in becoming familiar with the "inner workings" of cadet life.

An appendix outlining procedures for gaining appointment to the academy is included in the revised edition.

THE LITTLE WAR OF PRIVATE POST. By Charles Johnson Post. 340 Pages. Little, Brown & Co., Boston, Mass. $6.50.

BY MAJ ROBERT C. BURGESS, *Arty*

This is the story of the Cuban campaign during the Spanish-American War as seen through the eyes of a volunteer rifleman who was there. It is an absorbing tale told with humor and realism by a talented author.

The opening chapters describe the prebattle days of the wartime recruit starting with enlistment proceedings, continuing through the training period, and finally boarding transports bound for Cuba.

The actions of the regiment in the campaign which led to the capitulation of Santiago are brilliantly covered, including a detailed account of the battle at San Juan Hill. Following the Spanish surrender, the author describes the impact of the ravages of disease as the troops are hit by malaria, typhoid, and dysentery.

The book concludes with the return to the United States of our victorious forces, many of whom were hospitalized immediately as a result of sicknesses contracted in Cuba.

Mr. Post is not reticent about recounting failures where they existed, particularly in the field of the hastily designed logistic arrangements intended to provide support for the fighting forces.

Included are reproductions of the author's well-known illustrations of the Spanish-American War which effectively complement the text.

THE PROFESSIONAL SOLDIER: A Social and Political Portrait. By Morris Janowitz. 464 Pages. The Free Press, Chicago, Ill. $6.75.

The Professional Soldier is a scientific study of the hereditary and environmental factors which shape and influence the character and personality of today's military leaders. Unlike many studies of the military personality, it does not start with an assumption that the so-called "military mind" is a product from a service academy cast which is dependent on traditionalism and devoid of inventiveness.

Dr. Janowitz, a professional sociologist who has had considerable intimate contact with the military services, employs five basic hypotheses on which to base his analysis of the military profession over the last 50 years. These include the changes in the basis of authority and discipline which pervades contemporary society and are reflected in a shift from authoritarian domination to greater reliance on persuasion and group consensus. He points out that "the technical character of modern warfare requires highly skilled and motivated soldiers." These factors pose serious dilemmas for an organization with traditions of authoritarian discipline and conservative outlook.

A second hypothesis states that there is a narrowing skill differential between the military elite and the civilian elite. Over 93 percent of the personnel in the Civil War possessed "purely" military occupational specialties. The post-Korean Army had 28.8 percent in this category. The percentages were even lower in the Navy and the Air Force.

The third hypothesis states that officer recruitment has shifted from a narrow, relatively high social status base, to a broader base more representative of the population as a whole.

The significance of career patterns on the attainment of a position within the "military elite" is analyzed and the conclusions drawn are set forth as the fourth hypothesis.

Finally, the effect of the growth of the Military Establishment into a vast managerial enterprise with increased political responsibilities has produced a strain on traditional military concepts. After briefly setting forth his five hypotheses each is discussed at length in succeeding chapters.

This book is characterized by a broad understanding of the factors of military life and their influence on the professional soldier. This is an objective study and if read objectively can provide the military professional a greater understanding of himself, his contemporaries, and his career field.

PHILOSOPHY FOR A TIME OF CRISIS. By Adrienne Koch. 382 Pages. E. P. Dutton & Co., Inc., New York. $5.95.

This timely work presents excerpts from the contemporary writings of 15 eminent individuals. The selections include essays by religious and humanistic philosophers, philosophical novelists, and leaders in the fields of science, history, and economics.

Each writer conveys a deep awareness of the profundity of the world crisis which has developed since World War II. Since the writers are speaking from the basis of their individual perspectives, they are not always in agreement. However, they do share a common faith that we can "move forward to explore ways of life that would approach a life of freedom, of reason, and a world civilization."

In addition to the essays by such well-known figures as Einstein, Toynbee, Bertrand Russell, and Jean-Paul Sartre, the author has included her own well-written interpretation of the nature of the crisis.

This unique book affords military readers the opportunity to survey the results of such analyses by some of the world's greatest thinkers.

ALGERIA IN TURMOIL. A History of the Rebellion. By Michael K. Clark. 466 Pages. Frederick A. Praeger, Inc., New York. $6.00.

BY LT COL FRANCIS J. KELLY, *Armor*

This exhaustive and clinical dissection of the causes and events leading to the Algerian rebellion against French dominance, and the developments and consequences resulting from this struggle, is staggering in terms of the wealth of research material and the comprehensiveness of the analysis which Mr. Clark has made. This account is more than just a history of the events in that the mere recounting of principal characters and events has been broadened to include almost all social aspects of the problem.

The author begins with a review of the historical events since 1830 which are considered to have contributed to Algerian nationalism. He evidently has some distaste for the type reporting which has become the accepted rule in America. While many portions of the book read like an extended series of daily communiques from a practiced news correspondent, the author feels the need to present all facets of the problem together with statistical data to authenticate obvious facts which really need no documentation. He also appears to have access to many records and documents previously unused or unseen.

Mr. Clark's analysis concludes that the ineptitude of French politicians lost the opportunity to "fashion the bold new contours of a multiracial state 'and thereby' failed to seize what may have been one of the great opportunities of history." However true that may be, Mr. Clark is somewhat scathing of the US, the allies, and the United Nations in terms of their approach to, and handling of, the international aspects of the French-Algerian question. The author discloses several unreported sidelights on the relationship of Egypt and Nasser to the struggle.

In a treatise of this magnitude there is bound to be some repetition of material and relapsing use of an excessive number of alphabetized abbreviations to denote the political parties concerned which, in the over-all evaluation, tends to distract from the book's effectiveness. This is not a digested book, producing easily assimilated ideas, to be picked up and put down at odd moments. It is in many respects a primer for political science students in the analysis of a little understood problem area. Yet the well-informed individual will find this book a rewarding experience.

MR. LINCOLN'S GENERAL. U. S. GRANT. An Illustrated Autobiography. Edited and arranged by Roy Meredith. 252 Pages. E. P. Dutton & Co., Inc., New York. $6.95.

BY MAJ EDWIN J. MCCARREN, *Armor*

In this volume, Roy Meredith has taken excerpts from *Grant's Personal Memoirs* and more than 300 excellent photographs, paintings, sketches, and maps and combined them into a concise autobiography covering the period from Grant's birth to Lee's surrender at Appomattox. Of particular note is the treatment of the Mexican War in which many of the senior officers of the Civil War received their baptism of fire and gained experience which was to prove invaluable in the ensuing years.

Despite the condensation of text, continuity of essential material and the flavor of the Grant pen are preserved.

Although this book does not afford a comprehensive treatment of Grant's life, coverage of significant events is adequate for the casual reader and will spur the more serious student on to further research in those areas in which he has a particular interest.

For the military man this volume has two highly desirable features—it provides a quick, ready source of essential information, often with a personal touch, of the events covered, and the illustrations, many of them printed for the first time, are particularly well done.

CHEMISTRY OF NUCLEAR POWER. By J. K. Dawson and G. Long. 208 Pages. The Philosophical Library, Inc., New York. $10.00.

BY LT COL BERTRAM B. DALES, JR., *SigC*

In less than a decade weapons of unparalleled destructive power were developed. After a further decade the large-scale production of useful power from nuclear fission has become a practical reality.

This book gives a highly authoritative and informative account of the vital part played by chemists in the over-all program.

This work will be of use to those who have had scientific training and wish to become more closely acquainted with the impact of nuclear power developments upon nearly all the elements of the Periodic Table.

THE TANK COMMANDER'S GUIDE (Second Edition). Compiled and edited by Lieutenant Colonel John G. Cook, United States Army, Retired, and Dr. Robert A. Baker of the United States Army Armor Human Research Unit, Fort Knox, Kentucky. 488 Pages. The Stackpole Co., Harrisburg, Pa. $2.95.

THE CIVIL WAR DICTIONARY. By Lieutenant Colonel Mark Mayo Boatner, III. 974 Pages. David McKay Co., Inc., New York. $15.00.

Here is an authoritative and comprehensive reference work covering all aspects of the American Civil War. It contains over 4,000 entries on military and civilian leaders of the period, all major battles and campaigns, and many lesser battles and engagements. Included are 2,000 biographical sketches, short historical accounts of major units, and brief descriptions of the major weapons employed. This volume is an extremely valuable reference for the student researcher or writer on the American Civil War.

THE FROZEN REVOLUTION. POLAND: A Study in Communist Decay. By Frank Gibney. 269 Pages. Farrar, Straus & Cudahy, New York. $4.75.

BY MAJ JOSEPH L. STRELECKI, JR., *Arty*

The Frozen Revolution relates to a complete revolution in much the same manner as a limited war relates to a total or general war. This "limited" revolution by Communists against Communists achieved a measure of freedom or independence for Poland from the USSR that could not have been attained by other greater or lesser means. By using truly nonmilitary measured force, Communist Gomulka faced down Khrushchev and Company in October 1956 and later by making them realize that Poland would fight another attempt at Soviet colonization.

This was and is being accomplished by skillful tightrope walking so as not to cause the armed forces of the USSR poised on the Polish-Russian border to be unleashed.

The author analyzes the actions of Gomulka and the revolution from the standpoint of the party intellectuals, the clergy, and the peasants. Throughout the book he reveals that Poland, under Gomulka, can maintain the frost on her revolution only by loudly proclaiming two weakly palpable and very contradictory fictions. First, for Moscow, the impression is that Poland is run by a tightly controlled party exactly like the Communist Party in the USSR, and is giving loyalty to Moscow in every detail.

For home consumption the impression is created that Polish Communists are really "different" Communists who will never hesitate to sacrifice Marxism and their power to the needs of the united Polish people.

This volume is a very well-written, interesting, and sometimes humorous account of a beleaguered nation in a trying era.

FROM CEDAR MOUNTAIN TO ANTIETAM. August-September 1862. By Edward J. Stackpole. Maps by Colonel Wilbur S. Nye, United States Army Reserve, Retired. 466 Pages. The Stackpole Co., Harrisburg, Pa. $5.95.

BY LT COL HAROLD E. BEATY, *CE*

In the space of five weeks four important battles between the Union and Confederate Armies were fought on Virginian and Maryland soil. These battles were referred to as Cedar Mountain, Second Bull Run (Manassas), South Mountain, and Antietam (Sharpsburg). In a sense, they could be considered as a single campaign.

General Robert E. Lee with his Confederate forces went over from the defensive near Richmond and maneuvered and decisively defeated Major General John Pope's Army of Virginia at Manassas and Chantilly. Following this action, Lee invaded Maryland seeking to reach Harrisburg, Pennsylvania. However, he was turned back to Virginia by the Army of the Potomac under Major General George B. McClellan at Sharpsburg on 17 September.

Lieutenant General Edward J. Stackpole, Pennsylvania National Guard, Retired, presents in an interesting and readable manner a logical analysis of the reasons of the events of these battles. He bases his analysis upon the main characters of this historic drama: the commanders of the opposing forces. He has written this book in such detail that it is not necessary for the reader to be an expert upon the Civil War. Skillfully, he supplies the reader with adequate information so that the various characters, events, and terrain situations will be understood easily. Supporting the texts are 38 maps and over 50 contemporary illustrations which assist in following the battlefield maneuvers.

This book is a study of personalities, and one which the student of history or those interested in the Civil War will find enriching.

THE 3 STEPS TO MORE SKILLFUL MANAGEMENT. By Editors of *Nation's Business*. Three pamphlets, 48 pages each. Nation's Business, Washington, D. C. $2.40.

This collection of writings on management has been prepared by the editors of the magazine, *Nation's Business* from material appearing in its regular monthly issues. The articles have been printed in three separate pamphlets under the titles, "Managing Your Business." "Managing Your People," and "Managing Yourself."

Although the readings obviously are not directed explicitly toward a military audience, there is much in them which has military application. Such titles as "How to Say What You Mean," "How to Simplify a Problem," "Your Meetings Can Get Results," "How to Encourage Ideas," and "How to Get Facts You Need" are indicative of the scope of these writings.

THE DESERT AND THE JUNGLE. By Lieutenant General Sir Geoffrey Evans. 206 Pages. William Kimber & Co., Ltd., London, England. $3.50.

BY MAJ HERMAN T. HUNT, JR., *Armor*

This book is the story of five battles of World War II. The author took part in all of them and, with the exception of the first two, held a different rank in each. He participated in the capture of Nibeiwa during Wavell's first African offensive, helped capture Keren in the Eritrean campaign, and fought in the battle of the Omars.

In 1944 General Evans was a brigadier in Burma. His brigade defended corps logistical installations against a Japanese attack in a battle that may be typical of future wars. During the last of the five battles, the author commanded the 7th Indian Division in the crossing of the Irrawaddy.

The book contains useful lessons in almost every type of special operation. It is written in an easy style, and excellent sketches and maps are provided.

NE 1940

LLFUL
Nation's
es each.
C. $2.40.

nanage-
itors of
om ma-
monthly
nted in
e titles,
naging
urself."
are not
y audi-
has mil-
How to
implify
Get Re-
," and
indica-

LE. By
Evans.
., Ltd.,

Armor
ttles of
part in
of the
n each.
Nibeiwa
fensive,
an cam-
of the

igadier
orps lo-
panese
ical of
he five
he 7th
of the

in al-
tion. It
xcellent